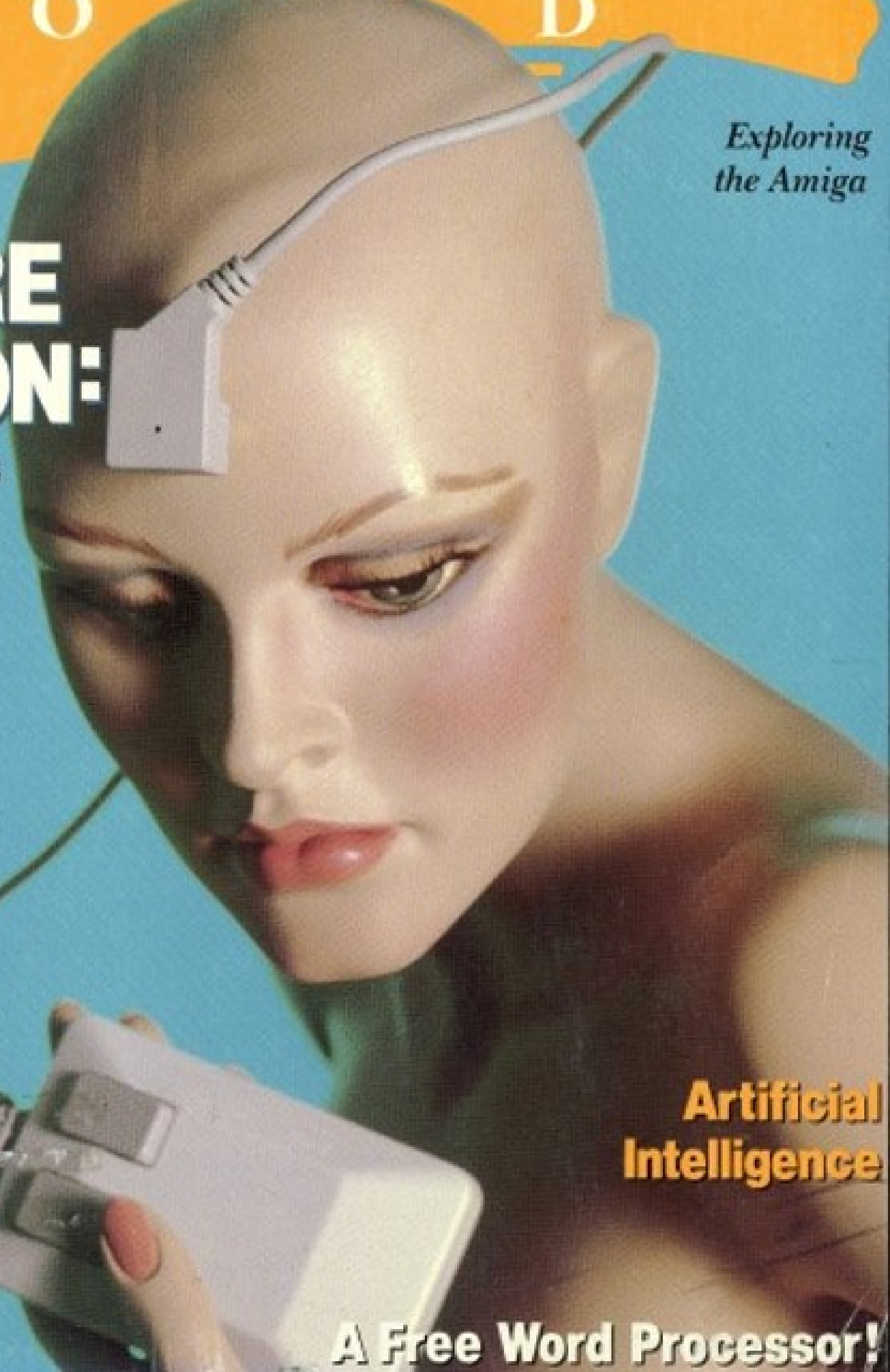
AMIGA WORLD

May/June 1986
U.S.A. $3.95
Canada $4.50
A CWCI Publication

Exploring the Amiga



SOFTWARE EXPLOSION:

Dozens of Products Reviewed and Previewed

Hidden Power: AmigaDOS/CLI

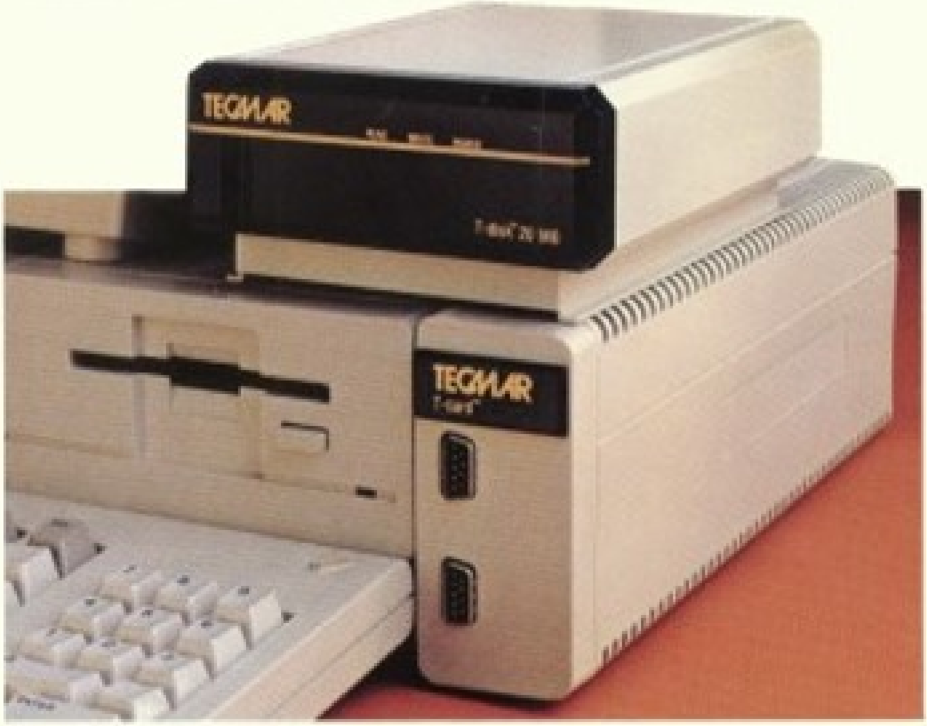
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Computerizing Your Business

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A Free Word Processor!

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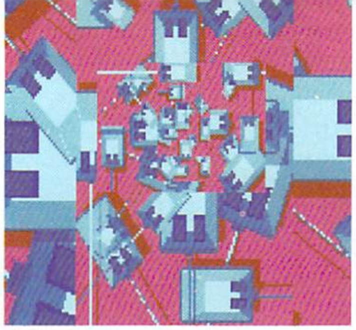
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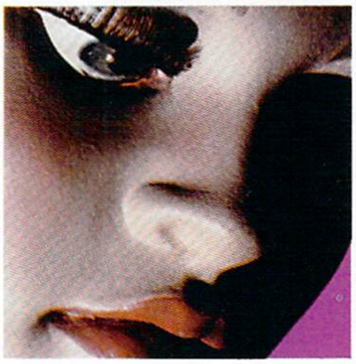


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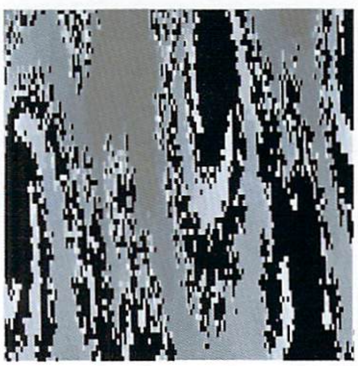
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VOLUME 2, NUMBER 3

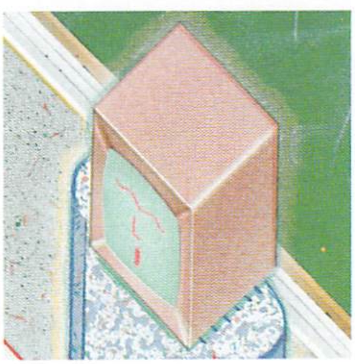
MAY/JUNE 1986



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Electronic Arts Presents 8 Good



1. DeluxePaint™

The most sophisticated paint program ever made for a personal computer. Loaded with special features like zoom enlarging, split-screen magnification, color cycling, blend, smear, shade, stretch, bend, and rotate. The custom palette mixing and unlimited brushes give you complete control over all of the Amiga's 4,096 colors. And it even works in 640 x 400 hi-res mode.

"The kinds of things painters love and miss in computer programs are all here in DeluxePaint."
—*Amigaworld*





4. Arcticfox™

The tank battle simulator. Feel the heat of tank combat as you command your two on-screen hands and their arsenal of heavy cannon, "seeing" missiles, and mines. Face a highly intelligent enemy in a completely three-dimensional Arctic battlefield. An accurate simulation of tank movement and strategies, with the bone-jarring sound effects and super hot graphics of the best arcade games.

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Take control of your finances. Financial Cookbook answers all your personal finan-cial questions and saves you money. From checking and savings accounts to IRAs and taxes. From variable interest rates to amortization schedules. Performs like a spreadsheet, a calculator, and an investment advisor, all rolled into one. The simple fill-in-the-blanks format makes complex financial questions—and saving money—a breeze.



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The action chess game with dragons, magicians, and trolls for pieces. When one piece lands on another, they have to fight a white-knuckle arcade battle for control of the square. The perfect blend of action and strategy, and a classic award winner.

"Game of the Year"
—*Creative Computing*

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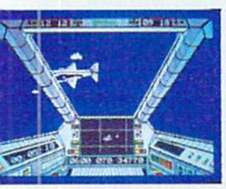
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Reasons to Own an Amiga.™



2. Skyfox™

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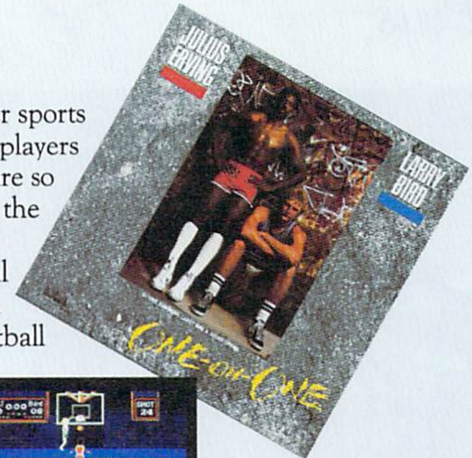
"Best Shoot-em-Up Arcade Game"
—*Family Computing*

"Best Action/Arcade Game"
—*Computer Entertainer*

3. Dr. J and Larry Bird Go One-on-One™

The number-one computer sports simulation of all time. The players look real, and the sounds are so detailed you can even hear the squeaking sneakers on the hardwood floor. Feels so real you'll think you're down on the court with these basketball superstars.

"Game of the Year"
—*Electronic Games*









6. Seven Cities of Gold™

Play the role of Columbus or Cortez in this lush simulation and adventure game. Learn history and geography as you explore the New World—and face the problems of the Conquistadors. Earn glory and gold, or wind up beached by mutineers. If you survive, the computer will generate unlimited new continents for you to explore.

"Best Role-Playing Adventure"
—*Family Computing*







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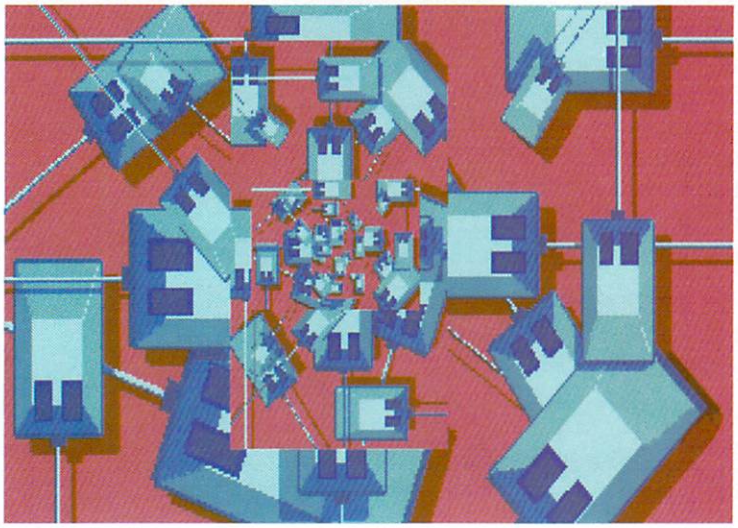
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Avision

By Steve Twombly

Value Plus



While the Amiga has been praised for its highly advanced features, the true mark of a successful microcomputer is made when new peripherals for that computer appear on the market, increasing the utility and value of the computer system beyond its out-of-box features.

The Amiga has sparked the development of a variety of add-on products that have been introduced very early on in the Amiga's life. Depending on your individual needs, with the addition of these products to your Amiga, the overall value and usefulness of your system will be greatly enhanced.

Several companies have introduced memory expansion peripherals for your Amiga, from 1-megabyte up to 8-megabyte configurations. In addition, at least three 20-megabyte hard-disk drives have been introduced so far.

A special stereo speaker unit is available, which fits right under your monitor and will put the Amiga's professional-quality sound at your disposal. Additional peripherals now available give you extra and fully switchable parallel and serial ports, giving the Amiga the ability to run more than one peripheral under the control of one switch; a surge-protected control center has been introduced to assist in controlling all of your add-on peripherals from one central source. It is even possible now to increase the performance of your Amiga by attaching the powerful 68020 microprocessor to your system.

For those with specialized video or multimedia needs, the Amiga Frame Grabber is available as well as the Amiga Genlock device. If you want the Amiga to control your music synthesizers, sequencers and drum machines, the Amiga MIDI interface will do the trick, and a stereo sound digitizer will add more excitement to your Amiga studio.

Some excellent color printers can be purchased now, and you can expect printer capabilities to increase as more Amigas are put into use. For use with your Amiga paint programs, you'll have the Kurta Penmouse for even more detailed drawings.

This is just a small sampling of the new Amiga products coming your way. They will enhance your new systems and increase the value and utility of your Amigas. New product introductions such as these are significant milestones in the destiny of a new microcomputer, and they assure users that a major commitment has been made by the industry to the new system. The fact that so much is available so soon is an added plus to Amiga owners.

When a microcomputer is launched, one question that is immediately asked is "What software can I run with it?", and this question has certainly been asked of the Amiga. A preliminary listing of this software was published in *AmigaWorld*'s March/April issue. By the time you read this issue, there will be over 180 software programs available, covering a broad variety of applications. These products are being brought to market by a diverse collection of companies. Business, entertainment, programming, graphics, music, telecommunications, education, animation and personal productivity software are all represented. Just consider some of the applications that you will have in the business category alone. There are packages for: word processing, database management and telecommunications; for accounts receivables, payables, general ledgers and spreadsheets; for statistics, decision analysis, sales and marketing forecasting, quality control and a variety of integrated packages, just to name a few.

Because of the add-on values already available for the Amiga, your system can be enhanced beyond the dreams of the microcomptuer user of just one year ago. These products, of course, are just the front runners. Many more are expected and will be available for you.

My review of the information you've provided through the *AmigaWorld* reader response cards indicates your strong interest in all of the above application categories. With so many new Amiga products coming out and with your diverse information needs, *AmigaWorld* looks forward to a busy year.

The Amiga is a superior computer, but with more and more peripherals on the market, the Amiga's potential value has increased dramatically. With new technologies such as CD-ROM and interactive video on the horizon, your Amiga will provide the best vehicle for you to remain at the forefront of the evolving microcomptuer industry.■

Zeitgeist

By Guy Wright

It is hard to decide exactly how to respond to the many critics of the Amiga computer and *AmigaWorld*. It seems as though people want new computers to spring fully born from the minds of the corporate engineers, complete with two or three thousand software packages, dozens of harware add-ons and a history of success. They are expected to sell a million or so units in the first month, sign up two or three thousand dealers, and if their name consists of more than three letters, it should have some sort of fruit as a logo (either way it should run both companies' software at least as fast or faster than on the original.) The machine should be cheap enough for the average bag lady to purchase, but expensive enough to be taken seriously in the business world.

If, by chance, you meet all of the above criteria (which is pretty near impossible), then there are only a few more hurdles to overcome. If you add extra features, then the critics will say that they are superfluous. Who needs 4,096 different colors to choose from? The Mac doesn't have color, therefore color *must* not be important. Stereo output? The PC, Mac and Atari ST don't have stereo, therefore it must not be worth having. Multitasking? Well, maybe that would be nice to have, but obviously if the others can't do multitasking, then who needs it? Having an open architecture was important enough for IBM and Atari, to a certain extent, so perhaps the idea has merit, but Apple has been heading in the opposite direction for some reason, and they don't have a great deal to say on the subject.

Followers of the other machines will be quick to raise objections, point out the few things their computers do that the Amiga doesn't and talk about how (even though a particular feature of the Amiga isn't really that important) they will soon/within a few months/ sometime this summer/eventually be coming out with their own update/revision/modification/entirely new computer/peripheral/add-on that can do the same thing.

As far as *AmigaWorld* goes, we are developing as the Amiga computer develops. In the beginning, when things were changing daily and no one was certain what, when or how much, we decided to only publish the information that we were 99% sure of. That way, we would not get caught saying one thing before the fact and having to fill our later issues with corrections. We also did not want to publish second- or third-rate articles, or articles on very obscure aspects of the Amiga written by hardcore engineers (who were the first to get Amigas). So, *AmigaWorld* published reasonably well-written articles on anything we could verify and on topics of interest to all computer users (even non-Amiga owners).

The charge that we weren't printing specific enough articles is, to some degree, true. The owners of the new Amiga wanted as much information as they could get because they were exploring new ground. They wanted (and still want) some help, some guidance, some facts. The trouble is that EVERYONE wanted the same help, even our authors. We had to wait until our authors had machines (if you bought your Amiga in 1985, then you know how hard it was to get one then), and after they bought the machines, we had to wait until they could do some exploring. Then we had to wait until they could put together their thoughts and discoveries, write everything down and send it in.

If you have followed *AmigaWorld* from the first issue up to this, our fifth issue, you have noticed that our articles have been getting stronger. More and more products are being completed by the manufacturers, so we have more to review. More authors have been writing articles that deal with Amiga-specific problems and features. More advertisers are placing ads in the magazine. (We don't kid ourselves into thinking that the only reason people buy the magazine is for the articles. In reader surveys, most people rate reviews, new product announcements and advertisements as their highest priorities. Of course, editorial pages rate both very high and, gulp, very low in the same surveys.)

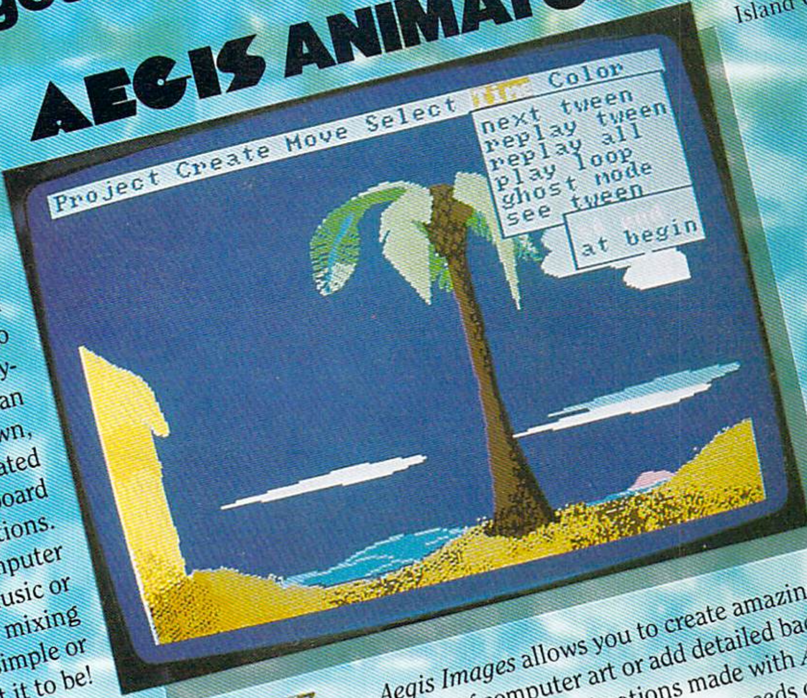
For all those who feel that the Amiga's special features are just insignificant extras, I would like to know if they sit at home listening to their "high-fidelity" monophonic victrolas, or do they own a stereo (and if they do own a stereo, is it all in one box, or can they add components?) Do they watch black-and-white TVs, or do they own color sets (and if they own color sets, do they only display four colors in medium resolution?) Do they cook, serve and eat their vegetables, then cook, serve and eat their potatoes, then cook, serve and eat their meat, or do they (gasp) cook more than one thing at a time? If they have problems with their car, do they take it to Toys-R-Us for service?

The bottom line is this: *AmigaWorld* is getting better and better. The Amiga computer started out being the best. Not just high in the list, not almost as good as, not nearly the same but cheaper than. The Amiga computer is the best microcomputer you can buy.■

Video Animation and Professional Quality Paint Software together at last!

AEGIS ANIMATOR

Illustration by Island Graphics



Aegis Development, Inc. can turn your Commodore Amiga™ computer into a full function art and animation studio! *Aegis Animator*™ and *Aegis Images*™ bring the power of the Amiga Alive!

Using *Aegis Animator*, you can create *moving video images* on your Amiga computer in full color! An internal graphics system allows you to build images and then manipulate them anywhere on the screen of your Amiga. You can rotate, move left or right, in or out, up or down, even right off the screen! Once you've created your images, you can add them to a storyboard and edit using cut, splice, and paste functions. When complete, you can send your "computer video" to a VCR and mix in any type of music or audio track using conventional mixing techniques. *Aegis Animator* is as simple or sophisticated as you want it to be!

AEGIS IMAGES



Aegis Images allows you to create amazing pieces of computer art or add detailed backgrounds to your animations made with *Aegis Animator*. Designed to meet the needs of professional artists, *Aegis Images* supports both 320x200 and 640x200 graphics modes with up to 32 colors (out of a possible 4096) on the screen at a time. A variety of artist tools are included with the system, including a choice of 20 brushes, airbrush with variable nozzle and spray, glow, wash, smear, gradient fill and dithering, single and multiple color cycling, and much more! Once you have created an image, you may move it, magnify it, rotate it, cut and copy it. *Aegis Images* also supports structured shapes such as lines, curves, circles, points, arcs, triangles, polygons, parallelograms, and text. Both *Aegis Animator* and *Aegis Images* use the Amiga standard IFF file format for easy data transfer to other programs.

There's no limit to the number of effects you can now create using *Aegis Images!* Combined with *Aegis Animator* they make a dynamic team! With a combined price under $140.00 US, there's no reason not to run out and get your copy today! • P.S. Don't let your friends use *Aegis Animator* or *Aegis Images*—you'll never get your Amiga back if you do! • *Aegis Images* is included with *Aegis Animator* and is also available separately. Created for Aegis Development, Inc. by the nation's leading graphics development company, Island Graphics. • Ask your dealer for details or call 1-213-306-0735

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Remember—software piracy is a crime.

AEGIS DEVELOPMENT

Aegis Development Inc.
2210 Wilshire Blvd., Suite 277
Santa Monica, CA 90403

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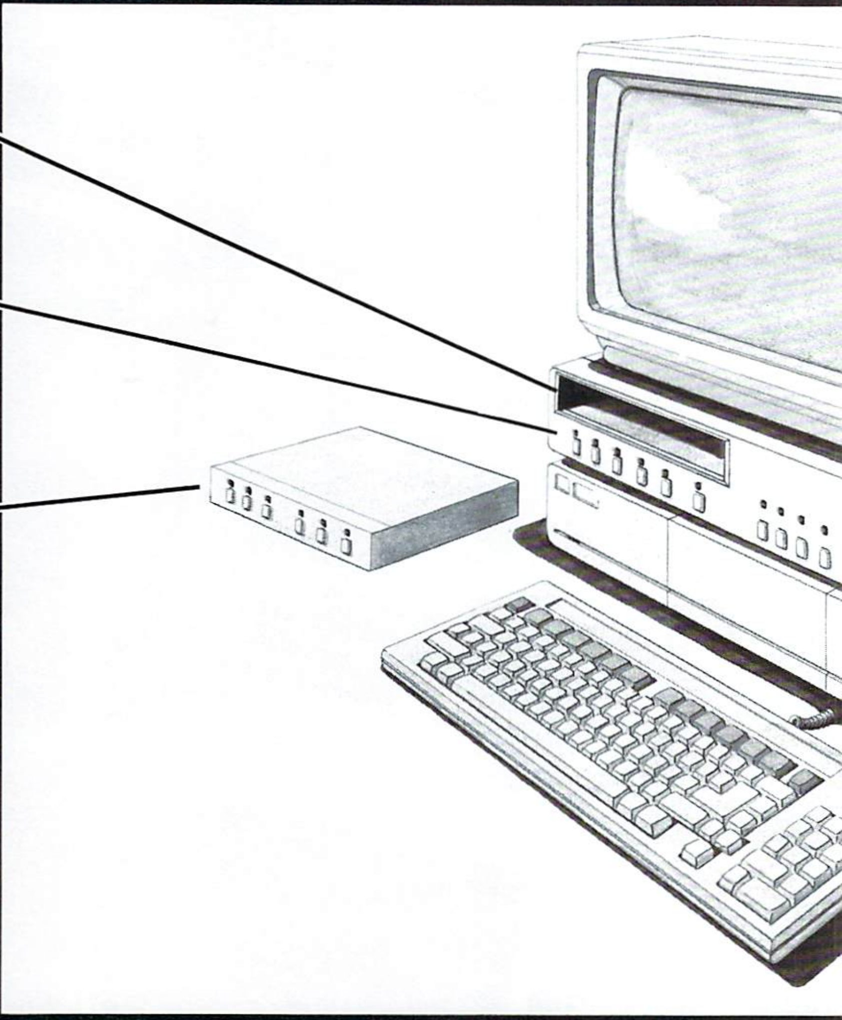
ALL A

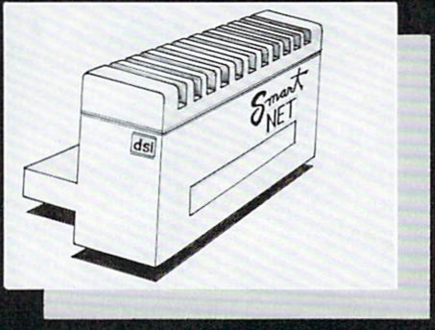
The Buss Station comes with a recessed slot which allows the user to store his most used/popular program diskettes only a fingertip away! The recessed slot can be removed to provide room for the optional DSI "Associate".

A surge, spike, RFI, and EMI interference suppressed, five outlet power control center which allows the Amiga computer, and four peripheral devices to be plugged into one fully protected power source. The front panel of the power controller section of the Buss Station, houses six switches (one is a master switch), each with an LED which lights when the corresponding switch is in the "on" position. Eliminates messy extension cord cabling, and allows the user to switch on/off his computer and all other peripherals from one panel.

The Associate is a multiport data switch which provides two fully switchable serial and parallel output ports for the Amiga. The front panel of the Associate section of the Buss Station houses six switches, each with an LED which lights when the corresponding switch is in the "on" position. The Amiga allows the use of only one serial and parallel device, however, the Associate increases the utility of the Amiga by allowing the use of up to two serial and parallel devices which are selected and controlled by the flick of a switch.

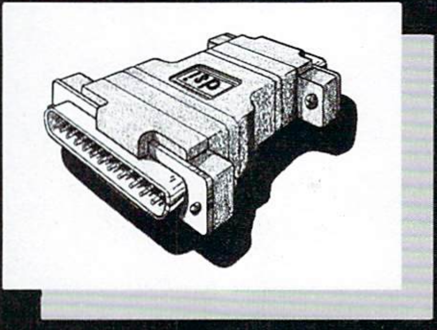
The Buss Station can be ordered with the Associate already installed at our factory or, the Associate can be ordered at a later date and installed at the dealership where the Buss Station was purchased or by the end user at his home.





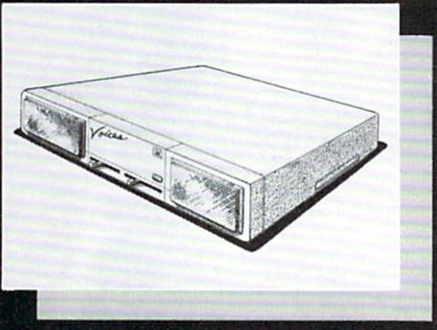
SMARTS

You can give your Amiga Smarts in two different ways. The first method requires a DSI Buss Station, a Smart 1 Ram Expansion Starter Card and up to three Smart 2 Ram Expansion Slave Cards. The second method requires a Smart Net, a Smart 1 Ram Expansion Starter Card and up to three Smart 2 Ram Expansion Slave Cards. The DSI Smart Net is an EMI/RFI shielded metal enclosure which interfaces to the Amiga, provides ports for, and encases the Smart 1 and Smart 2 RAM Expansion Cards. The DSI Smart 1 Ram Expansion Starter Card provides incremental RAM expansion and has the microprocessor circuitry necessary to expand the Amiga to an additional 2 megabytes of RAM. Smart 1 also has an expansion port which allows the user to connect up to three additional Smart 2 Ram Expansion Slave Cards. Each Smart 2 Ram Expansion Slave Card provides up to 2 megabytes of incremental RAM expansion for the Amiga. A combination of one fully loaded Smart 1 Starter Card, and three fully loaded Smart 2 Slave Cards will increase the Amiga's memory to its maximum potential of 8 megabytes. The Smart cards can be ordered with Ok, partially loaded, or fully loaded with 2 megabytes of RAM.



VISIONS

Due to the way the RGB TTL video output circuit of the Amiga was designed, it can properly interface to only a very small percentage of the many RGB TTL monitors on the market today. Visions is a video circuit designed to convert the non-standard RBG TTL video output of the Amiga to a standard IBM PC RGB TTL video output thereby allowing the user to choose from the widest possible variety of monitors available. RGB TTL monitors that can be interfaced to the IBM PC can be interfaced to the Amiga when Visions is used.

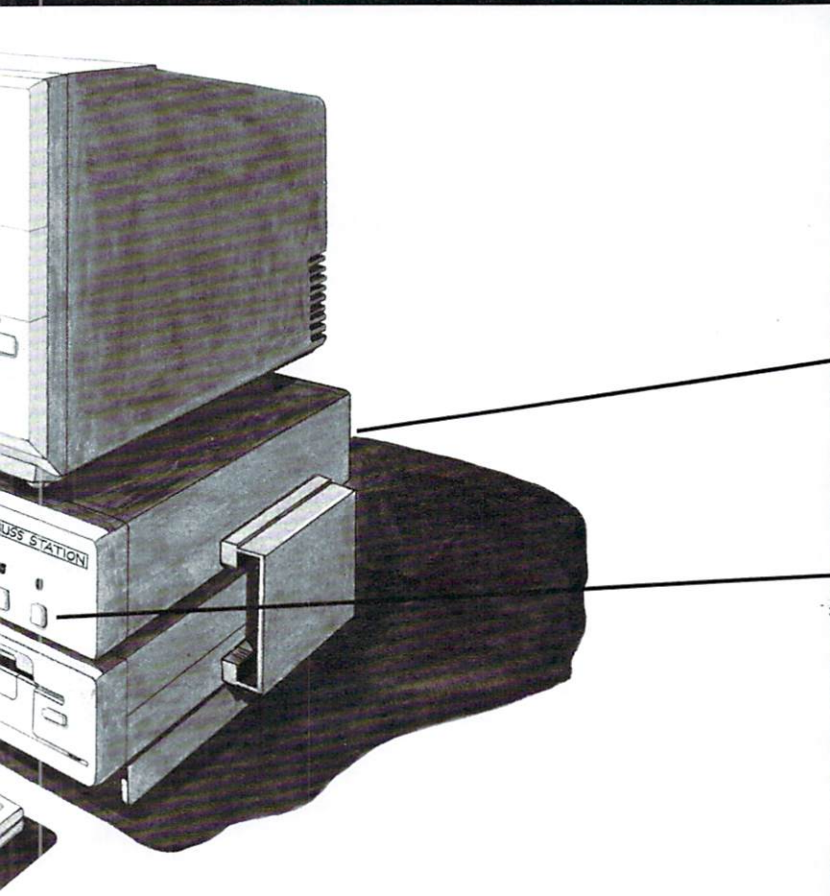


VOICES

Voices is a stereo amplifier with two full range speakers designed to fully utilize the stereo output ability of the Amiga where the use of a home stereo unit is not available or desired. The amplifier and speakers are encased in a low profile/high tech EMI and RFI shielded metal enclosure. Voices provides right and left channel stereo output jacks, which allow the user to connect the Amiga to a home stereo unit if desired and, a headphone jack for situations where quiet or privacy is desired. Voices can be used to provide stereo quality sound for audio and non-audio monitors.

For complete dealer and distributor information concerning the exciting new ine of DSI products please contact your local representative or DSI at the following address:

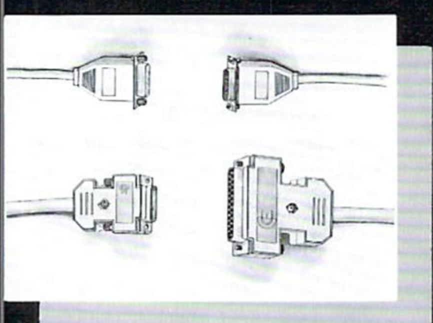
BOARD



A special RAM expansion port which allows the user to plug in the DSI "Smarts" and incrementally increase the memory of the Amiga to its maximum potential of 8 megabytes.

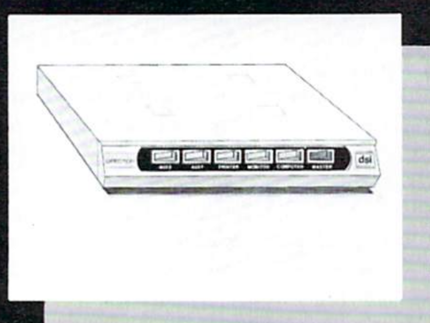
Eight 86 pin card edge connectors, identical to the one on the Amiga, giving it expandability comparable to the IBM PC. The front panel of the slot expansion section of the Buss Station, houses eight switches, each with an LED which lights when the corresponding switch is in the "on" position.

BUSS STATION



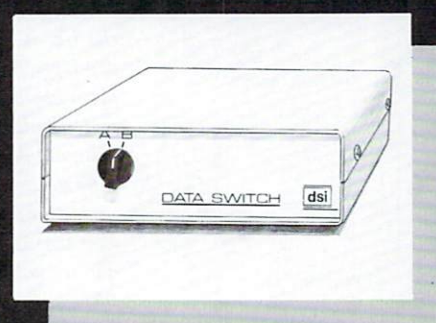
INTEREX SYSTEM
INTERFACE CABLES

The only totally comprehensive program of interface cables for connecting the Amiga to virtually all of the most popular analog RGB or digital RGB TTL color monitors, as well as composite monochrome and color monitors, serial printers and modems, parallel printers, keyboards, disk drives and other peripheral devices.



DIRECTOR

The Director is a surge, spike, RFI, and EMI interference supressed 5 outlet power control center for computers and peripherals.



DATA SWITCH

Six Data Switch models allow port expansion and sharing of computer and peripherals.

Circle 45 on Reader Service card.

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Telex: 650-193-4977

Repartee

Ex-MacFreak

Just wanted to let you know that I am an ex-MacFreak. Ever since I bought an Amiga, my Mac hasn't been used for more than five minutes. I have the Lattice C compiler for the Amiga and am very impressed with all of its library functions and its compiling speed. I was also able to find a telecommunications program called MaxiComm by MaxiSoft. It leaves much to be desired, but I have enjoyed many hours BBSing with my Amiga.

I really like the ability to use the Amiga's operating system through the CLI, something that couldn't be done with the Mac.

My Mac has been up for sale with all of its software, but the Amiga is getting so popular that I haven't found any buyers yet!

Stuart Sanders
West Los Angeles, CA

Be Kind to Developers

I would like to thank you for the interview with Brian Moriarty in the Jan./Feb. issue of AmigaWorld. *I hope to see more fascinating articles like it. As an aspiring software developer, it is very enlightening to learn about the approaches, visions and tribulations of successful software authors. I also hope that this information will help people to understand the energy and dedication that is involved in developing quality software, and will cause them to think more carefully before pirating the programs that they think are so outstanding. It's about time that software artists begin to get the recognition they deserve.*

Christopher R. Geiss
Huntington, NY

Amiga Talk

Congratulations on your decision to make the magazine AmigaWorld. *The information you print in that magazine is what took me from Tandy to Commodore. What you printed about the Amiga was so amazing that it was hard to believe without actually seeing it. But soon after I read your first issue, I found an Amiga dealer. And everything you said was correct. Now, everytime I hear about a new issue of* AmigaWorld *coming out, I rush to the store to buy a copy. I only wish that it were printed monthly instead of bi-monthly. But each issue is worth every cent. To help me, and other people like me, learn more about the Amiga, I put up a BBS called Amiga Talk. It is a place where Amiga users can meet and converse about this fantastic computer. The number is 602-846-3901.*

Chris Willey
SysOP of Amiga Talk BBS
Phoenix, AZ

OS-9 Multitasking

In the Nov./Dec. '85 issue of AmigaWorld, *Margaret Morabito compares the Amiga with the Mac and Blue PC. Under multitasking, she makes a statement that no machine under $10,000 has the ability to do many jobs at once.*

Multitasking in under $10,000 machines has been around for quite some time, contrary to Morabito's statement. OS-9 is true multitasking and runs on everything from the Radio Shack CoCo to 68000 machines. I own a SuperPet, which I assure you did not cost ten grand. In addition to five languages, it also runs OS-9 with a small hardware addition, even providing some 36K RAM space for RAM disk.

J. Allan Farquharson
Paris, Ontario
Canada

Anti-Warhol

When I bought the premiere issue of AmigaWorld, *I felt a sense of destiny. Well, it's now the third [Jan./Feb. '86] issue and much of the initial magic is gone. I know that the machine has superior graphics, sound and number-crunching capability. When will you stop telling me things I already know? Perhaps you think that people really care about Andy Warhol and his Amigas. If I wanted a treatise on the psychology of computer art, I'd take a liberal arts course. Don't get me wrong, I believe that* AmigaWorld *has some hope, but only if you abandon your artsy-fartsy attitude. Believe it or not, some people would like some information on programming techniques.*

Greg Hughes
Richmond, BC
Canada

I subscribed to AmigaWorld, *without owning an Amiga, in hopes of getting as much information about the computer as possible, so it was with some disappointment that I read issue no. 3 [Jan./Feb. '86]. While I admit that the debate of whether or not computer art is real art is interesting, I felt that filling as many pages as you did with art was overkill. These pages could have contained more information on the Amiga, its peripherals and its software—present and future.*

I hope that in the future these interesting and philosophical questions will be covered, but will take considerably less space. Is it possible that AmigaWorld *may be doing the Amiga a disservice by not emphasizing its other important points, such as speed, its DOS, multitasking, etc.? Are you overemphasizing art at the expense of business? (Lest you think*



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◀ *I have something against the arts, the main reasons I will buy an Amiga are for music and art.)*

Barry Silverstein
Menlo Park, CA

While I realize that the Amiga is new and it's difficult to get articles, I for one certainly don't want to spend my money to read an interview with a worn-out hippie like Warhol!

So far you have had no information on forthcoming programs, nothing on the technical aspects of the computer, nothing but articles on art, and I am getting fed up. I expected to see some programs, modem evaluations, printer info, etc. What do we get? Warhol—what a letdown.

Fred W. Little
Prescott, AZ

I recently bought a Commodore Amiga computer and subscribed to AmigaWorld *in the hope that your magazine might help me master this complicated and poorly documented new machine. So far, all I have seen is Andy Warhol and a bunch of hype. Do you turn down articles of substance or have you just not received any?*

Peter Schroeder
Miami, FL

I am a subscriber to AmigaWorld *and the owner of an Amiga computer. When your magazine first came out, I bought it eagerly as the only source of information about this new computer. A certain amount of floundering was understandable in the first issue, since the machine had not yet been released.*

However, here we are five months later, and AmigaWorld *is still floundering. Are you going to be a magazine for beginners? A magazine for accomplished programmers? For artists and musicians? Businessmen? Frankly, any of those choices would be preferable to what you're becoming, which is none of the above.*

Honestly, there are people out here who want to use their Amigas, and not just admire them. Instead of tongue-tied celebrities like Andy Warhol, you should be interviewing the Amiga experts.

William Kinnersley
Bozeman, MT

Okay, okay, no more Andy Warhol. The above is a sampling of the mail that we received from readers who were less than enthralled with our coverage of computer art in general and the Warhol interview in particular. But we thought that the interview was great. The thing we liked most about it was that it looked like one of our articles.

Art and creativity is just one of the Amiga-related topics that we intend to cover. We know you want to use your Amigas, and we're doing our best to help you get the most out of them. The issue you're holding contains the kind of information that many of you have been waiting for—how to access AmigaDOS, using the Amiga Editor, an overview of Amiga Basic and plenty of product reviews.

By the way, did anyone bother to read the articles in the Jan./Feb. issue on Cambridge Lisp 68000, TLC-Logo, telecommunications and adventure gaming? There was more than art in that issue, folks.

—Editors

Andy Finds a Fan

Congratulations on your new magazine, AmigaWorld. *I'm a new subscriber, a new Amiga owner, and even a new Commodore shareholder, all as a result of your magazine. That's right, besides subscribing and buying an Amiga, I also called my broker and invested in Commodore stock.*

On December 19, The Wall Street Journal *reported on its front page that this season's hottest sellers are the Amiga, the IBM PC and the Apple IIc. After comparing the Amiga's price and features to the other products, I'm convinced of Commodore's prospects for the future. The* Journal *also recently ran an article about a new Commodore executive (whose name escapes me) who came from Pepsi management. I was impressed by his comment, to the effect that "If I could make a living selling colored water (Pepsi), I should have no trouble selling computers." Now there's a leader.*

Even though I'm an MBA, I enjoyed the Andy Warhol piece and look forward to future aesthetically pleasing articles as well as business applications and solutions.

Kevin G. Kelly
Winter Park, FL

Thanks for the vote of confidence. That Commodore executive is Thomas J. Rattigan.

—Editors

Help for Help Key

Help Key seems to be in need of help. The premiere issue states that the Amiga's processor runs at 7.8 MHz. The Jan./Feb. issue tells us that a 7.8 MHz 68000 is nonexistent, and then sidesteps the question completely by not saying how fast the processor does run. InfoWorld *(Dec. 2, '85, p. 28) lists the following speeds for the 68000: Macintosh, 7.8 MHz; Atari 520 ST, 8 MHz and Amiga, 7.16 MHz. A trivial issue, true—but who is right?*

Keep it coming! Oh, and how about showing a little lightheartedness and humor. Why be so serious all the time?

Jeff Kerschner
Sanford, ME

InfoWorld got that one right. The correct speed of the Amiga's processor is 7.16 MHz. A thousand pardons.

As for humor, *AmigaWorld* has plenty of it. Didn't you read the Andy Warhol interview? For more humor, see our interview with Rodney Dangerfield on page 97.

—Editors

Amiga vs. Atari

A cautionary tale: In early 1984, Jack Tramiel, ex-CEO of Commodore Ltd., filed suit against his old company. The subject of Tramiel's expensive legal battle was the Lorraine computer. You see, Mr. Tramiel wanted control of this computer very badly. Tramiel lost his court battle and the Amiga-Lorraine became the Commodore Amiga.

Later that same year, Tramiel bought Atari and hastily, some say too hastily, developed the 520 ST.

The moral of the story: Jack Tramiel, acting President of Atari, spent a small fortune in pursuit of the Amiga. Tramiel had to settle for an ST, but you can have the Amiga he so desperately wanted.

Dan Gray
Cochranton, PA

We'll take it!

—Editors

Send your letters to: Repartee, *AmigaWorld* editorial, 80 Pine St., Peterborough, NH 03458. Letters may be edited for space and clarity.



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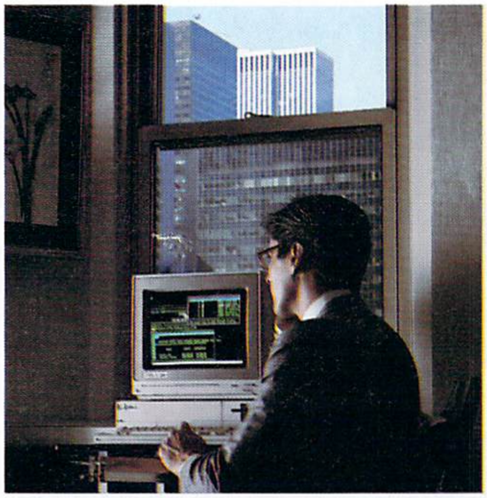
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Window on AmigaDOS: Using the Command Line Interpreter

The power of AmigaDOS is yours through the use of the Command Line Interpreter (CLI). As an alternative to Workbench, the CLI gives you more direct control of your Amiga. This article is an introduction to "opening the window" on the world of AmigaDOS.

By Louis R. Wallace

Two main types of user interfaces are commonly used in today's personal computers. One is the symbolic, or icon-based system, popularized by the Macintosh and used on the Atari ST and other systems; the other is the traditional keyboard approach, or use of the Command Line Interpreter (CLI). Symbolic systems involve icons that represent different computer functions that are manipulated by the user with a mouse, joystick or lightpen. A minimum of keyboard entry is involved, making the use of the programs very easy, especially for new users.

The second approach, from the keyboard using the Command Line Interpreter, is more common; with the CLI the keyboard serves as the major (usually only) source for inputting commands to the computer. All functions are performed through the use of specialized commands, some of which reside in memory and some on disk. The IBM with its MS-DOS environment (PC-DOS) is probably the best example of this type of computer/user interface.

The Amiga gives the user the capability of using *both* types of interfaces, so two completely different approaches to using the computer are possible.

Manual or Mouse?

Each approach has its pros and cons. An interface featuring icons is undoubtedly easier to use and learn about, shortening the time between getting started and making constructive use of the machine and its programs. The CLI, however, generally allows you to have more direct control over the machine and perform more specialized complex tasks. It is not as easy to learn as the icon method (since naturally it involves typing and learning commands) and therefore requires more time to overcome the inevitable learning curve associated with such new undertakings.

As mentioned above, the Amiga, unlike its predecessors in the PC world, allows the use of both types of interfaces. It uses Workbench, an icon-level user interface that makes use of the Amiga's Intuition operating system and allows access to the CLI, the command line that uses AmigaDOS to control the computer.

The Amiga Workbench disk comes with the CLI "disabled" or inactive, and, unless you activate it, uses the icon interface to control the system. However, it is a simple matter to open the CLI window and gain access to the more powerful AmigaDOS.

Getting into AmigaDOS

To enable the CLI for the first time, open the Preferences screen from Workbench by selecting the Preferences icon. (If you haven't scrutinized Preferences before, take the time to do so now.) The Preferences file is examined by the computer each time you power up, and the information it contains is used to configure your system. It controls and defines the default colors, screen positioning and layout, printer configuration, as well as many other things, one of which is the access to the CLI.

On the left side of the Preferences screen, you will see the CLI on/off gadget. Select the On option with the mouse (left button). The CLI is now enabled. Unless you want to have to do this each time you power up, move the mouse now to the Save gadget (bottom right) and select this also. Your new Preferences setup will be saved to disk, so you will be able to open the CLI from Workbench from now on without having to go into Preferences. After saving your Preferences setup, the Amiga will take you back to the Workbench window. Select the System drawer icon, and when the System window opens, you will see the icon for the CLI (along with those for Diskcopy, Init and IconEd). You can now open the CLI window and use AmigaDOS. (I would suggest you use the screen gadgets to open the CLI window to a full screen. This way you can display, for example, your complete directory in the window all at once.) ►

◄ Welcome to AmigaDOS. Take a minute to browse the list of AmigaDOS commands on p. 24. Most of these 45 commands are themselves executable programs. Some are quite simple and self-explanatory, like Dir (Directory). Others require additional parameters with them, such as Diskcopy *df0: to df1:*. Others, like NewCLI and Run, concern themselves with multitasking, while some, like ED or Edit, help you generate even more complex commands called Batch Files.

The AmigaDOS commands reside in the c (for command) subdirectory on your Workbench disk. If you want to display all the commands in the directory, type Dir c. To list them to your printer instead of the screen, type List c to prt:. This will give you a hard copy of the command directory.

None of these commands are resident in the computer. They are transient commands based on the disk. This has the advantage of conserving memory, but requires a second or two for the computer to load and execute them. For example, when you type Dir df1:, AmigaDOS loads the command from the c subdirectory and then executes the directory program, using df1: as an additional parameter that directs the computer's attention to drive 1. After listing the directory, the memory used for the directory command is restored to the system for other programs to use.

Commanding Amiga

One of the special AmigaDOS commands is Run. This command allows the user to create a non-interactive CLI process to perform a *task* (or tasks) as a *background* process. This is what is commonly referred to as multitasking, and with the proper use can make your time at the computer extremely efficient. You use this feature by following the Run command with some other CLI command (e.g., a directive to list a file to a printer). AmigaDOS creates a second "hidden" CLI and proceeds with your orders, while you are still able to continue working on other things. Here is an example:

```
Run Type myfile.data to prt:
```

This creates a separate CLI task whose function is to print the contents of the file myfile.data to the printer. You can now begin working on some other task, without waiting for the first task to end. When it's finished with its background task, AmigaDOS frees the memory it was using and automatically terminates the CLI involved with it.

It is also possible to link several statements together to be run as one by following each with a plus (+) sign. AmigaDOS interprets each line after the plus sign as a continuation of the previous one. This way you can set up more complex tasks than one line will allow. For example:

```
Run Type df0:myfile.data to prt:+
Diskcopy df0: to df1:+
Delete df0:myfile.data
```

The linked statements above would cause a new task to be created that would print a file, then duplicate the disk in the internal drive to an external drive, and finally delete the file from the original disk. And it would do it while leaving the computer (and you) free to do other work.

The Run command will work with large programs as well as DOS commands. I often run Amiga Basic as a background task. That way I can simply pull the screen down to get at the CLI window, which is hiding just behind the Amiga Basic window. Sometimes I rearrange things so each process has half a screen, and jump back and forth between them. In a 512K Amiga, I'm able to open over 20 CLI windows at one time.

In case you're wondering, each task running appears to have full control of and access to the Amiga. The Amiga is so fast, and as long as you have ample memory, the tasks don't interfere with each other. If they do have to share some of the hardware, priorities dictate which task goes first. This is usually the task that's been running longest. How AmigaDOS evaluates priorities is a subject in itself, but it is possible through Assembly Language programming to set task priority.

Directory Structure

Another very powerful aspect of AmigaDOS is the disk filing system used. It allows the user to group common files into separate subdirectories, and then to make subdirectories within those subdirectories as needed. This allows the user to have logically ordered disk directories and not just a huge number of filenames that scroll by every time you ask for a directory. These directories are the *drawers* you may be used to opening from Workbench.

Each disk starts off with one main directory, the *root* directory. All filenames within this directory must be unique. Suppose, for example, you were to format a disk, then create a file and store it to that disk with the name file1. If you were to create a second file and save it to the same disk using the same name file1, it would replace the original file, leaving only one file by that name. However, you could have used the command Makedir to create additional directories (within the root directory) after you formatted the disk. (See Figure 1 for an idea of directory structure.) Then you could have stored the first file in one subdirectory, and the second file, even though of the same name, in the second directory. Since the files would belong to different directories, they would not disturb each other.

Just as each file within a directory must be unique, so must each subdirectory. You cannot have two subdirectories named Games in the *same* parent directory; you can have two subdirectories named Games as long as each resides in a *different* parent directory. You could even have a directory named Games that contains a subdirectory also named Games (though it might defeat the purpose of avoiding confusion!).

This ability to have multiple directories within a single disk is very useful. For a programmer, it is often convenient to have one directory containing source code and another with executable code. Or perhaps ►

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several people are sharing a computer system but don't want to take a chance on altering or disturbing each other's datafiles. The solution would be for each person to have a separate directory. Perhaps a single user wants to keep database files and word processing files distinct. This system makes it logical and simple.

Directories offer still more power to the AmigaDOS user. To find a file within these subdirectories is very simple, once you get familiar with the idea of subdirectories. Since each filename is unique only to the directory in which it resides, there could be confusion when trying to use a file that has the same name as another that exists within another directory. AmigaDOS handles this quite easily. As far as it is concerned, the *only* files it knows about are those within the *current directory*. Therefore, if you are in directory A, the only file AmigaDOS will acknowledge as, say, file1 is the one of that name within its boundary (Dir A). So if you are in directory A and type Dir, the *only* files you will see on the screen are those in Directory A.

Two ways of directing AmigaDOS to the desired subdirectory are possible. One way is to change directories using the CD command (for Current Directory). For instance, if you type CD directory1 your default directory will change to directory1 (assuming it exists within the original directory). If the desired directory lies within another directory, you must indicate the path for the AmigaDOS command to take. For example:

CD maindirectory/directory1

Or perhaps the directory you want is on a disk in an external drive. In that case you would type:

CD df1:maindirectory/directory1 {df1: = external drive 1}

Both commands above would make directory1 the default, and any Dir commands would show the files within the desired directory.

Another way of accessing files in a different directory (or another device) without changing the default directory status is by using *pathnames* within the command. The syntax is very similar to that given above. To get a list of the files in a directory named, say, Arcade, that is in a directory named Games, on a disk in drive 1 (external drive), you would type:

List df1:games/arcade

All the contents of the Arcade directory in drive 1 would appear on the screen.

Referring to Devices

AmigaDOS supports several disk devices, each with their own names. The disk drives are referred to as dfn:, where the n would be either 0, 1, 2 or 3. The internal drive is drive 0; three external drives are supported by AmigaDOS. If you have a hard disk, it has its own special device name, dh0:. As mentioned before, you can include directory and filenames with the device name to select your pathway.

Other special hardware devices can be addressed by name from AmigaDOS as well. Some you will use often,



others are very advanced features best left to skilled programmers. For instance, you can direct file input/output through the serial port with the Read and Copy commands:

Copy myfile.data to ser:

This would send the file designated myfile.data to a device on the serial port, perhaps a printer. You could direct output to a printer without worrying what port it required with the prt: device name. Using this sends data to whatever port you have previously selected from your Preferences file. For example:

List myself.data to prt:

Other devices are Con:, which creates a new window, and Nil:, a dummy device whereby AmigaDOS "throws away" whatever is sent to it.

Con:300/25/200/50/NewWindow

The above line would create a new window with the screen coordinates 300 and 25, width and height 200 and 50 pixels respectively, and titled NewWindow (window titles are optional).

Edit myfile.data to Nil:

This would allow you to move through the file myfile.data with the line editor while having any edited output discarded.

Making a RAMdisk

If you want, you can use some of the Amiga's memory and the device RAM: to create a RAMdisk. A RAMdisk is an area of computer memory set aside and acted upon by the computer as if it were a separate disk drive. You can store both datafiles and executable programs in a RAMdisk with as many directories as you wish, just as with a floppy drive. The advantage of doing this lies in the greatly increased speed of all activities associated with the RAMdisk, as opposed to a normal drive, since disk access is completely avoided. You could copy all of your AmigaDOS commands to the RAMdisk and assign it as the default device for AmigaDOS. To do this type:

Makedir Ram:c
Copy Sys:c Ram:c all
Assign c: Ram:c

You will notice some disk activity after you type each line, but when the Amiga is finished you will have all of your commands resident in the memory of your RAMdisk. Subsequent use of the commands will be much faster. This does, however, require 128K of RAM, so it is not practical unless you are running with at least 512K. ►

What is practical is to be selective about the commands you put in the RAMdisk. Some commands are used frequently, while others are used seldom, if ever. I only copy those commands to the RAMdisk that I use often, saving myself a lot of memory while still getting the speed gained from avoiding disk access for the commands.

If you wish, you can type the sequence of commands to copy the files to RAMdisk everytime you power up. Since I am known far and wide as a lazy person, I can't bring myself to do that. Luckily the solution is a simple one. . . *batch files.*

Batch Files

Batch files are simply executable lists of instructions in a text file that are treated as commands being typed in at the keyboard. They can be created on the Amiga with the full-screen editor, ED, that resides on your Workbench disk. (ED is actually an AmigaDOS command and can be found in the c directory.) Before proceeding with batch files, we need to spend a little time with ED.

AmigaDOS Commands

;	Comment character
< >	Direct command I/O
ALink	Links section of code into one file for execution
Assem	Assembles MC68000 language
Assign	Assigns a logical device name to a filing system directory
Break	Sets attention flags in a specified process
CD	Sets a current directory and/or drive, or returns current
Copy	Copies one or more files from a directory or drive to another
Date	Returns the current date and time or used to set same
Delete	Deletes files or directories
Dir	Displays files in default directory or a specified drive/dir
Diskcopy	Copies one whole disk to another
Download	Downloads programs to the Amiga from other systems
Echo	Displays string in command argument, DOS version of Print
ED	Full-screen editor for writing text files
Edit	Line editor
Endcli	End interactive CLI process
Execute	Executes a batch file of commands written with ED or Edit
Failat	Halts execution of a command file at specified error code
Fault	Displays messges corresponding to supplied error codes
Filenote	Attaches a note of up to 80 characters to a given file
Format	Prepares a blank disk in AmigaDOS format
If	Used to test specified actions in a batch file
Info	Gives information about drives in use
Install	Makes a disk formatted for AmigaDOS bootable
Join	Concatenates up to 15 files into one file
Lab	Defines a label in a command sequence
List	Lists detailed information about files and/or directories
Makedir	Creates a directory with a given name
Newcli	Creates a new interactive CLI process
Prompt	Allows user to define the prompt character(s)
Protect	Sets file protection status
Quit	Exits from a command file with a given error code
Read	Reads info from the serial or parallel port into a file
Relabel	Changes the volume name of a disk
Rename	Rename a file or directory
Run	Executes a command as a background process
Say	Instructs the Amiga to speak what follows
Search	Looks for a specified text string in all files in a directory
Skip	Jumps forward to a label in a batch-command sequence
Sort	Sorts simple files
Stack	Displays or resets the stack size
Status	Displays info on current CLI processes
Type	Types a file to the screen as either text or hex
Wait	Waits for or until a specified time
Why	Explains why the previous command failed

ED is one of the better text editors I have used on any computer. It is not exactly a word processor, but it has similar characteristics. Basically it is a full-screen text editor used to create text files. Besides batch files, it is used to write source program files for Amiga Basic, C, Pascal or Assembly Language. ED allows you to indent lines in your program (for structured programming), delete lines, insert lines, search for character strings, perform block copies and deletes, combine files and much more. (*See our article on ED in this issue, p. 28.*)

Let's create a batch file using ED that will create a RAMdisk and copy the required commands to RAM for

Device Names

DF*n*:	(*n* is 0–3, floppy drives)
DH0:	(hard drive)
SER:	(serial port)
PAR:	(parallel port)
PRT:	(printer designated by Preferences)
CON:	(window creation from DOS)
NIL:	(dummy device)
RAM:	(RAM-based filing system)

you, set the date and increase the stack size. Before doing this, you should make a backup copy of your Workbench disk (if you haven't already). By doing this, you end up with both Workbench and CLI system disks.

At the CLI prompt type:

ED ramdisk (activates ED and creates a new file, ramdisk)
{*Once "inside" ED, type*}
Echo "Making a RAMdisk"
Say making a ramdisk
Makedir Ram:c
Copy c/dir Ram:c
Copy c/cd Ram:c
Copy c/list Ram:c
Copy c/type Ram:c
Copy c/newcli Ram:c
Copy c/endcli ram:c
Copy c/run Ram:c
Copy c/date Ram:c
Copy c/copy Ram:c
Copy c/info Ram:c
Stack 8000
CD Ram:c
Echo "Enter time and date in HH:MM DD-MMM-YY format"
DATE ?
Info
Date [*esc*] {*press escape key*}
X {*press X then* [*return*]}

►

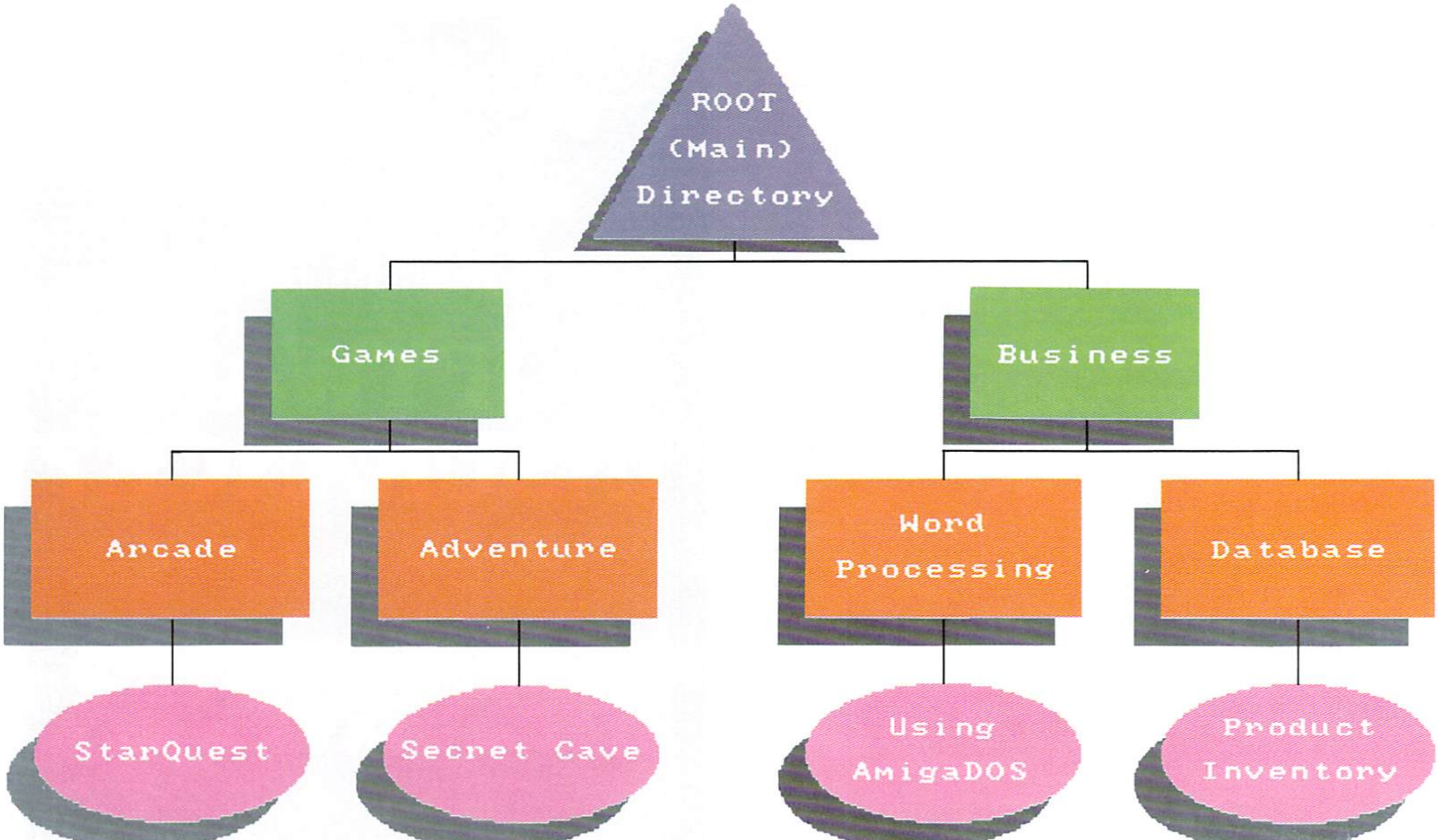


Figure 1. Example of AmigaDOS directory structure.

◄ You will now exit ED to the CLI and the file named RAMdisk will be saved. To use this batch file, type Execute ramdisk. The file will be executed as if you were typing in the commands directly from the keyboard.

Changing your Startup

If you, like me, often prefer to use the CLI instead of Workbench, you can easily use batch files to "take over" the computer each time you power up and direct it to the CLI immediately, without having to go through Workbench. The secret is stored away in the s subdirectory on the Workbench disk. In the s subdirectory, you will find a batch file called Startup-Sequence that is read by the Amiga each time the Workbench disk is inserted. This file directs the Amiga to load Workbench with the command LoadWB, which loads and runs the icon systems. It is followed by Endcli, a command that turns off the CLI and turns control over to Workbench.

To make a Workbench disk that will default to the CLI and set up the RAMdisk we made earlier, you must rename the Startup-Sequence as something else and create your own. With your copy of the Workbench disk in the internal drive, type:

Rename s/Startup-Sequence to s/OldStartup-Sequence

If you have not made the batch file RAMdisk above, do so now with one small change: Instead of typing ED ramdisk, type ED s/Startup-Sequence and proceed as above to make the batch file. This will become the new Startup-Sequence and will be executed automatically every time you boot with this Workbench disk. If you had already made the RAMdisk batch file, then go ahead and rename the Startup-Sequence as OldStartup-Sequence, as above. Then type:

Copy df0:ramdisk to df0:s/Startup-Sequence

This will make a copy of the RAMdisk file in subdirectory s with the name Startup-Sequence. That's all that's required. Now you will go directly into the CLI instead of Workbench.

Concluding Remarks

To use the CLI instead of the icon/mouse environment, insert the new disk you have modified when prompted for the Workbench disk. You will be able to use the CLI with a RAMdisk to begin exploring some of the powerful features of AmigaDOS. Have fun!■

Please note: We have used capitalization in some instances to make reading AmigaDOS commands easier, but no capitalization is required by AmigaDOS, therefore you could type either Rename or rename, df1: or DF1: and AmigaDOS wouldn't care. You can learn the proper syntax for using AmigaDOS commands by typing the command followed by a question mark at the CLI prompt (e.g., copy ? will give you the format for using the Copy command; you must have a space between the command and the question mark).—Editors.

Address all author correspondence to Louis R. Wallace, 6124 B SW 11 PL, Gainesville, FL 32607.

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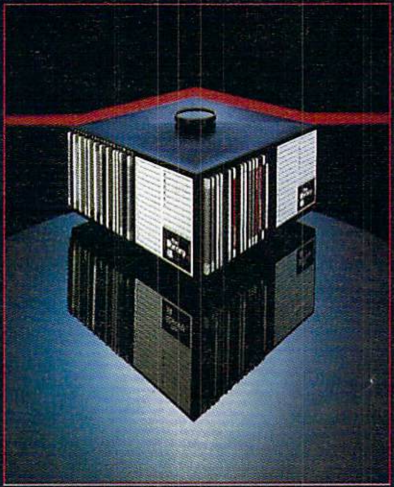
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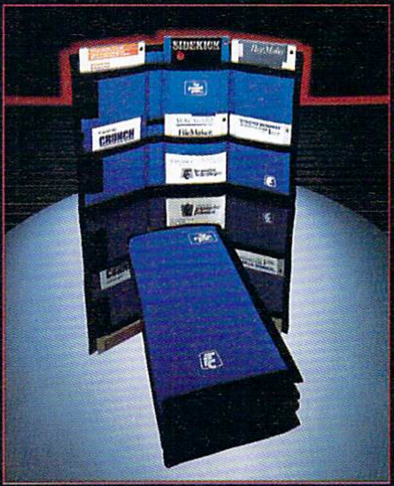
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Our appreciation to all software publishers and disk manufacturers who supplied products in this ad.

Using the Amiga Editor

By Jon Baker

In the basic Amiga package, Commodore has wisely included a full-screen text editor. If you just need a word processor for letters or an occasional term paper, you could get by quite well with just the Amiga Editor.

Word processing divides neatly into two tasks: text editing and text formatting. Editing is simply the process of typing the text into a file. Text formatting is what happens when you print your file. It's the formatter that provides the automatic functions and controls the printer. Things like underlining, right and left justification and automatic headers with page numbers are formatting jobs.

With the Amiga Editor (ED), you'll have to do those formatting jobs yourself (or you could use Basic to write a simple formatter). Fortunately, this editor is a good one. It does manage the margins for you, which is often a formatting task. The only real hassle is the page breaks, and there's a trick I'll show you to make it easier. One nice thing about this kind of word processing is that what you see is really what you get. You see the margins right on the screen and there are no imbedded formatting commands to fiddle with.

I should mention the other editor—EDIT—that comes with the Amiga. It is the type of editor that usually comes with an operating system, that is, a line editor. If you have programmed in Basic, you have probably used a line editor. (Microsoft's Amiga Basic includes a full-screen editor.) I don't know why operating systems always come with a line editor. Maybe system programmers want us to know how tough computing was on Teletype machines. Certainly, no one in their right mind today would attempt to use a line editor for any purpose other than to write the code for a screen editor. You can save about 19K of disk storage space by erasing EDIT from your working disks.

Using ED

You won't find the Amiga Editor documented in the basic documentation. It is only accessible through the CLI (Command Line Interface). The commands and utilities available through the CLI are documented in the AmigaDOS User's Manual, which must be purchased separately. Another article in this issue describes accessing and using the CLI ("Window On AmigaDOS," p. 18). I'm going to assume that you've read that article.

You invoke the editor by typing ED [filename], where filename is the name of the file you want to edit or create. For large files, you can also reserve more editing space by including a size specification, as in ED [filename] SIZE 45000. The default size is 40,000 bytes. It's easier if you're positioned in the directory of the file to be edited; use CD [directory-name] to get there before invoking ED.

ED has two types of commands. Commands that you use while editing are called *Immediate* commands. They are all implemented with control (CTRL) key combinations. The other type of commands are called *Extended* commands. For these, you press the escape (ESC) key, which produces a command line at the bottom of the screen where you type the command. ED is always in Insert mode. To change existing text, you must type the new text and then delete the old text.

For the Immediate commands, you just hold down the CTRL key while you press some other command key. They're all pretty straightforward, so I'll refer you to the Quick Reference Chart (p. 30) for explanations of them. The only commands that are a little strange are the U and D commands. The way they work is the opposite of what you would expect. If you press CTRL U, the file moves up, not the screen window.

The Extended commands are more versatile because you can combine more than one on the command line simply by separating them with a semicolon. You can also prefix a command with a number to make it repeat a certain number of times, or use the Repeat command (RP) to cause a command (or group of commands) to be repeated from the current line to the end ►



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Quick Reference Chart

Special Keys

Backspace	Delete character to left of cursor.
DEL	Delete character at cursor.
ESC	Enter extended command mode.
Return	Split line at cursor and create new line.
Up arrow	Move cursor up one line.
Down arrow	Move cursor down one line.
Left arrow	Move cursor left one character.
Right arrow	Move cursor right one character.

Immediate Commands (Accessed with the CTRL key)

CTRL A	Insert line after current line.
B	Delete current line.
D	Scroll file down screen 12 lines.
E	Move cursor to top or bottom (End) of screen.
F	Flip case of cursor character.
G	Repeat last extended command line. (aGain)
O	Delete (Omit) next word or spaces.
R	Move cursor to end of previous word.
T	Move cursor to start of next word.
U	Scroll file up screen 12 lines.
V	Verify (Rewrite) screen.
Y	Delete (Yank) remainder of line.
]	Move cursor to start or end of line.

Extended Commands (Press ESC to enter Extended Command mode)

A/text/	Insert [text] as a line after current line.
B	Move cursor to bottom of file.
BE	Mark Block End at current line.
BF/text/	Find [text], looking backwards.
BS	Mark Block Start at current line.
CE	Move cursor to end of line.
CL	Move cursor one position left.
CR	Move cursor one position right.
CS	Move cursor to start of line.
D	Delete current line.
DB	Delete previously marked block.
DC	Delete character at cursor.
E/txt1/txt2/	Search (Exchange) and replace [txt1] with [txt2].
EQ/txt1/txt2/	Exchange but query first.
EX	Extend right margin, current line only.
F/text/	Find [text].
I/text/	Insert [text] as a line before current line.
IB	Insert previously marked block after current line.
IF/filename/	Insert file [filename] after current line.
J	Join current line with next line.
LC	Recognize lower case when searching.
M n	Move to line number [n].
N	Move to start of next line.
P	Move to start of previous line.
Q	Quit editing without saving text.
RP	Repeat next command to end of file or error.
S	Split line at cursor.
SA	Save all text to file.
SB	Show marked block by making it current line.
SH	Show editing information (margins, tabs, etc.).
SL n	Set left margin to column [n].
SR n	Set right margin to column [n].
ST n	Set tab key to skip [n] characters.
T	Move cursor to top of file.
UC	Equate u/c and l/c searches.
WB/filename/	Write previously marked block to file [filename].
X	Exit ED, saving file in the process.

PRINT THIS SIDE

of the file. By use of parentheses, command groups can even be nested. For instance:

T; RP (N; 1 A/ /)

will start at the top of the file, putting a double space between every line. T tells it to start at the top (otherwise it would start at the current line). RP says to repeat to the end of the file. N tells it to move to the start of the next line. The 1 is optional, and says to repeat the A/ / one time. A/ / inserts a blank line after the new current line. If this sounds confusing, it's only because it is. But you can always issue the commands one at a time to make it simpler. If you make a mistake, you can cancel a command in progress by pressing any key. One little tip: Use the SA command to save the current state of your file before you do anything too drastic. You can then use T; RP D to delete the mess you made, and IF [filename] to get back the SAved version.

Being able to operate on blocks of text is what makes computers better writing tools than pencils and paper. Block commands let you write without worrying about neatness; you can easily clean up the mess after you get your thoughts into print. ED has a good variety of block commands. To mark a block, position the cursor anywhere on the first line you want in the block and issue the Extended command BS. Move to the last line in the block and use the BE command. You won't be able to tell the block is marked; no special characters appear to indicate what block is marked. One thing to remember about ED's block commands is that they effect entire lines. You cannot mark only a portion of a line. For instance, say the cursor is in column 10 and you enter the command BS. The entire line, from column 1 to the last character on the line, will be involved in any block operation you subsequently issue. You can Copy Blocks (IB—insert block), Delete Blocks, Move Blocks (IB; DB) or Write Blocks to a file (WB). Note that the printer is considered a file, so the command WB /PRT: will print the block. The IF command is the opposite of the WB command in that it gets a file and inserts it after the current line.

Word Processing with ED

Using ED for word processing is basically a matter of making what you see on the screen look exactly like what you want to come out of your printer. There are a few pointers I can pass along. First, you should decide on your left and right margins and enter the following command:

SL [n] ; SR [m]; ST [n + 1]

where n is the first column of your text and m is the last column. With this command entered, ED will always start a new line in column n, and will move any word that overlaps column m to the next line. If for some reason the cursor winds up in the left margin, you tab out of it with the tab key.

Enter your text exactly as you want it, but don't worry about page breaks or double spacing until you're finished writing. When the text is complete, you can get double-spaced text with the command T; RP (N; A/ /).

The following is the trick I promised for getting the page breaks right. It's not exactly foolproof, but what the heck? It's free.

1. Position the paper so that the print head is over the first line that you want to print and set the top-of-form. In other words, if you want a five-line margin, start at the top of the page and press line-feed five times. Then reset the printer to set the top-of-form.

2. Position the first line of text for the page (the header) at the top line on the screen.

3. Press CTRL U four times, and then press CTRL E. Each time you press CTRL U, 12 lines scroll off the screen; so, you just counted 48 print lines. Take however many lines you want on a page and subtract 48 from it (55 works well, so 55 minus 48 is 7). Press the down arrow that number of times (7). The cursor is now sitting on the first line of what should appear on the next page. Put a mark at the beginning of that line and also at the beginning of the previous line. Your header and trailer will go between those two lines in order to skip the page break.

4. Now, subtract the number of lines you want to print from the number of possible lines on a page (66 – 55 = 11). That is how long the trailer needs to be, so insert that many lines between the two lines you marked in step 3. Now you can copy your header into the text so that it immediately follows the trailer.

5. Put a Block Start (BS) on the first line of the trailer. Put a Block End (BE) on the last line of the header. Now, use your Write Block (WB) command to save the trailer/header combination in a file, so you won't have to go through all this for every new page. You can delete those line markers now.

6. Position the first line of the header at the top of the screen and count down to your next page break, as you did in step 3. From here on, every time you count to a page break, back up one line and issue an IF [filename] command, where filename is the file you used to save the trailer/header.

Your file should now be ready to print. To do it without leaving ED, use this command: T; BS; B; BE; WB/ PRT:. You can also print it from the AmigaDOS CLI prompt. After you save your file and exit ED, enter:

TYPE [filename] TO PRT:

where filename is the name of your file.

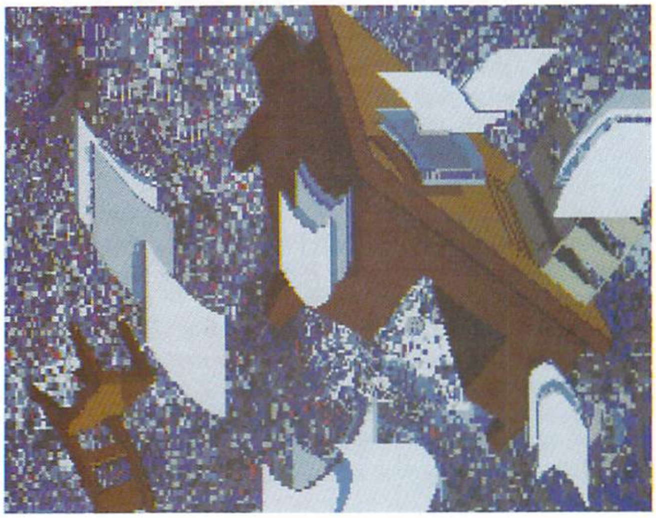
All of this may seem rather involved, but it's really not once you get the hang of it. By using the Amiga Editor instead of an expensive word processor, just think of all the money you can save for something really interesting. As for myself, I've got my eye on this new adventure game where you break into this top secret supercomputer and save the world from. . . well, I don't know what, but it sure sounds like more fun than spending $200 on a word processor.■

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Computerizing a Small Business

Some do's and don'ts and other sound advice about putting a computer to work for you.

By Guy Wright



Things have been going along fairly well. You're making a little money. The product is being shipped. Bills are being paid. But your desk is beginning to look as if a blizzard of paper swept through it last night, and you have this nagging feeling that you're slowly losing your grip on things.

Late one night, while wading through the bills and inventory reports and work orders and phone messages, you wonder if a computer might help. At least with a few of the more tedious tasks, like inventory, mailing lists or accounting. Computers are good at those kinds of things, aren't they? Most businesses use computers these days, don't they? If a big computer can help a big business, then a small computer ought to be able to help a small business, right?

Right.

Which Computer?

But before you rush out and plop down your money, you decide to check out a few things. You talk to a few friends, go to a computer dealer and maybe buy a few magazines.

You know that you are going to be doing serious work with the computer, so you don't want a toy. (Just imagine asking the clerk at K-mart or Toys-R-Us for advice on an accounting program!) At the same time, you aren't ready to spend tens of thousands of dollars on a refrigerator-sized mainframe or a minicomputer (if you are thinking about a mainframe or mini, then you are reading the wrong article). A personal computer, or microcomputer, sounds like the best choice at the moment, so you shop around.

The first computer that springs to mind is an IBM. They have the power, speed and software that you think you might need, but when you look a little closer, you find that there are some details that the commercials don't mention. Price is the biggest detail. A dealer will tell you that an IBM PC or PC-AT are good machines, and they are, but everything that you might want to do with one will require adding internal hardware, and that hardware is not cheap! Nothing about IBM is cheap, either hardware or software. If it has those three magic letters on the package, you can automatically add $150 to $300 to the price, compared to the exact same product on another computer. Another drawback to IBM, for many people, is the attitude that seems to read: "User friendliness may be nice for some computers, but we are talking business here, and business people want results, not ease of use!" If the computer and software are so difficult to use that you can't get it running properly, you will never get results.

The next alternative is the Apple Macintosh. On the surface, the Mac looks pretty good (and once again, it's true that the Macintosh is a good machine). It is easy to use and the prices are better than IBM's, but people say it is a bit slow and difficult or impossible to upgrade, and even after you have learned how to use the machine, you are always locked into that beginner level.

So where does that leave you? An IBM clone? You still have the unfriendly operating system. Another brand of computer? Where is the software and hardware support? And there is always the possibility that

the company might disappear the day after you buy the machine.

Obviously, since you are reading this magazine, you are investigating (or may have already purchased) the Amiga personal computer.

The Amiga is appealing because it combines the ease of a Mac with the power and speed of a PC or PC-AT. At the same time, it is an excellent graphics machine for people or businesses that rely heavily on illustration or graphics of any kind. Video graphics, print graphics, design graphics or just plain business charts and graphs. The Amiga is an excellent tool, whether it is used to create a finished product or as a "sketch pad" for experimenting.

Who Should Computerize?

Almost any small business could use a computer to its advantage. Any business that has an inventory, billing, payables or mailing lists of customers to keep track of can use the help of a computer—to keep records, for word processing, telecommunications or to keep a database of clients or inventory.

Anyone who spends any more than $500 or $600 a year in bookkeeping or accounting charges should certainly consider a computer. Contractors can use a computer to do estimating and job tracking, people who have salesmen and representatives on the road can use it to keep information on clients. Any time you write something down on paper to keep a record, you could use a computer instead. There are thousands of things that a computer can do to help make any business operate more efficiently.

But not all businesses need all the features of a particular computer or a piece of software. For instance, even though many accounting packages offer fully integrated modules, some businesses may not need an accounts-receivable module. They may have heavier accounts payable, so they would never use an accounts-receivable module. Others might pay for everything in cash and have a lot of accounts receivable, but no payables. Many small businesses use computers for bookkeeping and accounting, saving them money on accountant fees. You will save money if you computerize and keep your records properly. With computers, accounts receivable, for instance, means more than just accounts receivable; it means keeping track of your customers, invoices, mailing list, how much customers owe you and how they pay you.

Who Shouldn't Computerize?

A very small business might not benefit from a computer. A good guideline to follow when deciding if a computer would help you might be to consider whether the cost of the computer is going to outweigh the total profit of the business for a year. But take into account how much you could save with the computer. So if you were spending $500 a year on bookkeeping, deduct that from the total cost of a computer. Also remember that you can depreciate the cost of the computer, so you have an added advantage there. The computer is considered an asset. If you have little or no knowledge of computers and don't really care to spend the time necessary to learn, then it might not be a good idea for you to try computerizing.

Evaluate Your Needs

If you're a small-business owner, the most important thing for you to consider is what you do and what you could use a computer for to make your operations smoother, your record keeping easier and more efficient and your information more readily available. Only then should you seek out the software when you go to talk to your computer dealer. Have in mind very specifically what you want the computer to do. Seek software first and hardware second. This applies at all levels. When you are going to look for a printer or other peripherals, evaluate what needs you have ahead of time and what your software can handle. If you plan to be doing a lot of graphs, then you might need a dot-matrix printer or plotter. If you plan to do extensive mailings, or if you think that you will be using the printer heavily, look for something sturdy, even though ►

Have in mind very specifically what you want the computer to do. Seek software first and hardware second.

it may cost you more. If only occasional use is expected, then a less-expensive model or a slow letter-quality printer might be a good choice. If you are going to be keeping an extensive database, then you may need a hard-disk drive, but check to see if the software you intend to use will work with a hard disk. Evaluate your needs ahead of time.

If you are not sure of what your needs are, how would you go about getting advice? A computer dealer will give you advice, but that is not necessarily the best place to get advice about your business. Probably the best place to get advice is from someone that you might know who has a business of their own that they have recently computerized. Beyond that, you could certainly get advice from your accountant. A lot of accountants have computers, and they can advise you and point you in the right direction. There are also consultants available who specialize in setting up small businesses and will take you through everything step by step. They can analyze your needs, assist you in purchasing the hardware and software and train you to get up and running with it.

The cost of your computer equipment can be written off, but can software be written off? There are no hard and fast rules about how the IRS looks at software, so check with your accountant or the IRS. But in the meantime a good rule of thumb is that if the software is less than $250 or $300, you can expense it, but if it is $1,000 or $1,500, say, for an integrated package that does everything for you, then you might consider it an asset or a capital expense.

Getting Started

So you are convinced that computerizing your business is the right thing to do. That new Amiga is going to answer all your questions and solve all your problems. Well, there are a few more things that you should keep in mind. First, no software will answer 100% of a company's needs. Don't get in over your head buying software that does absolutely everything.

The president or owner should be the one to initiate the conversion, because if he is not into it and behind it all the way, then it won't work. Whoever ends up participating in the computerization process has to be enthusiastic and driven to spend the extra hours learning the system. And you can expect to spend long hours. It's not a job for after-school or temporary help. Once you get that initial work done, however, you should be able to get more done in a given eight-hour day.

Computers won't give you a panacea. They won't make your business do better. They won't improve profits. But, if you run them right, they will provide you with up-to-date, real-time information, allowing you to make better, more informed and timely decisions. Through being more efficient, your business will profit.

The Learning Curve

How much time should a person expect to spend in the training and learning process? It isn't going to happen overnight. If you are keeping records now, by hand, then you should continue to do that even after you get a computer. Use the two systems in parallel. Why? Because Murphey's law certainly applies to computers. You *will* have problems. You *will* lose data. You *will* run into something that you didn't think of when you bought it all, and you *will* need to go out and buy something more. In terms of time, you can expect to spend hours and hours at night getting to know the hardware and software and just playing around with it all. But this is very productive time. It is productive to just sit and "play around" with the computer so that you can discover just what the computer can do for you.

It's good to have very specific ideas in mind about what you want the computer to do for you, but as you get to know the computer, you will begin to realize that it can do more for you than you ever dreamed.

One Thing at a Time

Is there such a thing as over-computerizing? Yes. You can get into too much. Most entrepreneurs who have small businesses don't understand much about general-ledger work or the higher levels of accounting that go beyond bookkeeping. Most don't even understand very much about bookkeeping. So you can get into an overkill situation where you just can't keep up with the amount of misinformation that you are putting into the computer. To avoid this, start out by doing just your accounts receivable on the computer, then add accounts payable, and then add other modules to the system. Eventually, you may want to hire someone who knows accounting, and then they can add your general

ledger, etc. Just make sure that the system you choose can grow and that it can grow easily.

Even if you have a business that needs many different software features, just do one thing at a time. You can spend the first month just learning how to use the computer. At the same time, you will learn how to use it for your business. Then, for two to three months, while you're still keeping your records by hand, you can put your accounts receivable on-line; you can use it to get reports and other information you need, allowing you to proivde better service to your customers. At the end of that three-month period, when you have confidence that the computer and software are working fine, you can discontinue your paper records and start keeping them on the computer. Then you might think about adding accounts payable, going through the same process; only this time, instead of taking three months to keep the records both on paper and on the computer, you may feel confident enough in the system and your use of it after only two months. Then you can add inventory, billing, etc. Whatever your problem area is, that's the area that you should attack first on the computer. Then you can add other things.

Will an accounting program help teach you how to organize your data? In many instances, it will just help you along the road to ruination. There's a wise saying in the computer field: To err is human, to really screw things up takes a computer. If you are a bad record keeper to start with, a computer is not going to make you a good record keeper.

If you are not dilligent about putting the information into the computer in a regular and orderly fashion, then you are not going to be any more organized than you were before you got the computer. You may even be less organized. If you aren't good at keeping the records for your business, then you should hire someone who is. Lack of efficiency in record keeping could be costing you thousands of dollars each year in profits, and eventually it could cost you your entire business.

On the other hand, if you keep your records up to date on the computer, on a day-to-day basis, in a consistent, orderly fashion, you will always be able to get the information from your computer that you need to know to make decisions and plan for the future. If you see your profits going down, then you can respond. You will also be able to foresee when you are going to be behind the eight ball. Every business is cyclical in one way or another. With up-to-date, real-time, consolidated information, you will be able to predict when the ebbs and flows are going to occur so that you can prepare for them.

Pitfalls

Here are some of the major pitfalls of computerizing a business:

- Buying the hardware before the software. Find out first what the software will do and what peripherals it will need.
- Expecting the computer to do too much for you. ►

- Stopping the old methods too quickly.
- Not getting the right advice from the right source. You need advice from business people who use computers, not computer dealers who are selling computers, or Uncle Fred who keeps his Christmas card list on a VIC-20. Get advice from business people who use computers and have been through the learning curve.
- Going for the cheapest. Mail-order buying can save you money, but you sacrifice the hardware and software support that a dealer can give you. If you order through the mail, then know what you are getting ahead of time.
- Being led on by advertising hype. Before you buy anything, know what you are getting. Try out a program or ask someone who has tried it. Get all the information you can about the hardware and software before you buy and you will save yourself a good deal of time and money. Expect to make a few mistakes no matter how much research you do.

Do Your Homework

There are a lot of things to consider when computerizing. You must take the time to educate yourself beforehand. Research is very important. Remember that things will go wrong. You can count on it. Do things in both the old way and the computerized way so that when things do go wrong, you won't be left high and dry.

You should also check with your dealer about loaner equipment. If the system breaks down, what are you going to do for a week while your computer is in the shop?

The list of do's and don'ts goes on and on. The best that you can do is get sound advice, evaluate your needs, research the best you can, don't expect miracles and dive in. There are a thousand questions that we haven't answered and a thousand things that will come up when and if you decide to computerize.

There are no hard and fast rules here. Each business has it's own needs and you are the best person to determine how an Amiga with the right peripherals and software can best be put to use. And, much as we hate to admit it, an Amiga may not be the right computer for you. There may be a particular software package that you desperately need for your business that will only run on a Plingsnart IV, and if that is the case, then buy one. You may find that as your business grows, even an Amiga can't keep up, and then it might be time to look into a minicomputer.

The Amiga won't answer every business problem, but if it is used correctly, it can certainly help in businesses of any size. If worse comes to worse, you can always play games with it.■

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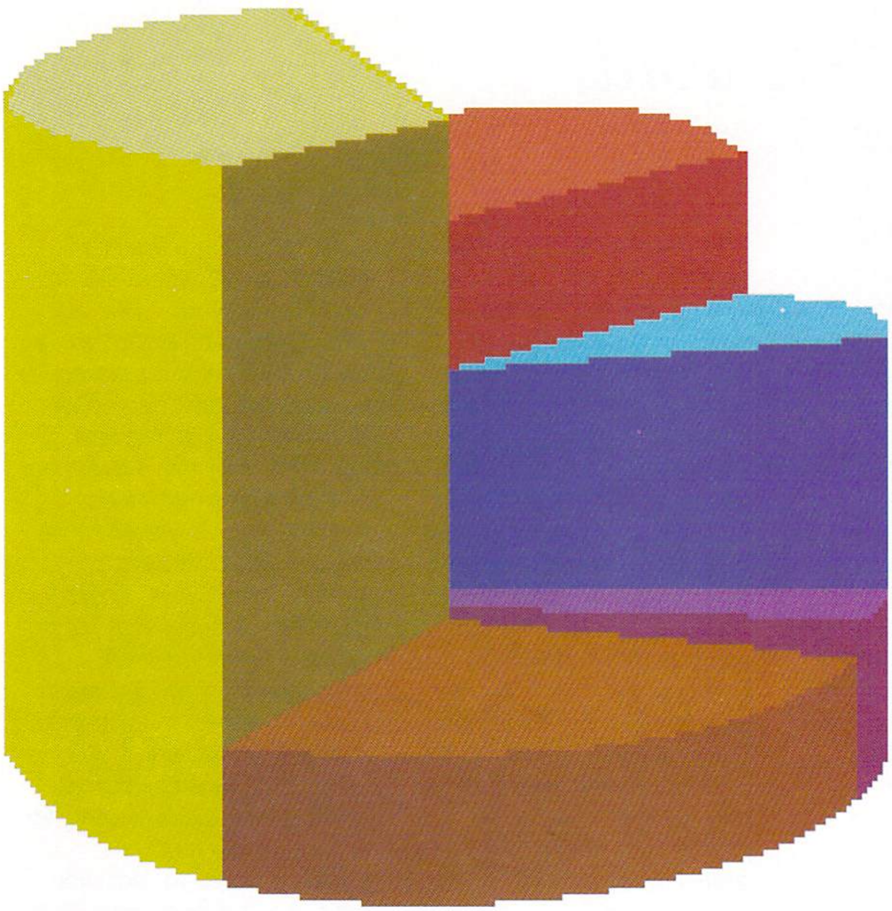


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Business Graphics

By Matthew Leeds



Graphics-design software can be used by businesses to create useful, inexpensive charts, graphs and illustrations, enhancing communication and decision making.

Presentation graphics are big business. The production of charts, graphs, overhead transparencies and slide shows has boomed in the last eighteen months. Over $80 million was spent in 1985 on the production of 100 million finished images for use in corporate communications, in-house brochures, training materials and annual reports.

The Intro

Until recently, art for business was produced by hand using straight edges, pens, typesetting machines and all the other paraphernalia of the illustrator. Several years ago, a division of GE came out with a system known as Genegraphics. This was a line of high-end computer graphics hardware specifically for the presentation graphics market. They changed the way corporations created computer graphics. These systems had entry costs in excess of $100,000 and produced finished art with resolutions greater than 2,000 lines.

As time went by, the cost of hardware began to fall, and the power that could be packed into a system went up. Prices went from below $50,000 to under $25,000, and finally PC-based systems hit the $10,000 mark. None of these, however, can approach the $2,000 price of an Amiga.

The Pluses and Minuses

The ability to produce professional-quality graphics on a personal computer frees businesses from the traditional separation between those who need the finished artwork and those who produce it. Communication between an art department and a sales department may not always produce the desired results; unnecessary revisions may take weeks, deadlines may be missed. These problems can be avoided with the use of low-cost PC-based business graphics systems. Chargebacks can become virtually unknown, and concerns about data security can be brought within manageable limits. Managers no longer need to worry that the competition may be presented with a bar chart of sales quotas before their own bosses see it. Many companies do business with the government, and have to follow strict guidelines on control of access to sensitive information; by bringing the production in-house, security checks can be kept at a minimum.

Another important benefit comes through the reduction in costs. The production of display graphics has previously been an expensive proposition: a single bar

chart or pie chart could cost in excess of twenty dollars, 35mm slides could go as high as one hundred dollars. The investment involved in bringing production in-house can often be recouped in less than six months.

Some drawbacks to this trend exist, however. Many of the people who will now suddenly have access to art production equipment will have had no art training. Mauve-on-green bar charts, cluttered overhead transparencies, thirteen different fonts on a single title slide, and other "creative" applications are often the pride and joy of a novice, and it may be hard to dissuade the boss from using his or her first creations at a presentation to the board. Choosing the proper media and medium is only part of the process in designing a presentation. Decisions regarding the type of audience, objectives of the presentation and depth of information to be presented need to be worked out before any production is started.

Another consideration is the fact that once the production of presentation graphics becomes accessible to more people, and the ease of that production becomes understood, the demand for graphics increases dramatically. This could result in certain people finding an increased workload with no concomitant increase in salary. The trade-off of more end-user power is more end-user responsibility.

The Final Presentation

By far the most common type of output being used today in business is the paper hard copy. Interestingly, plotters seem to be used more than printers. The main reason appears to be the higher quality of the finished product. Plotters are also used in the production of overhead transparencies. Drawing directly on acetate sheets, plotters can produce high-quality graphics, but they are not known for their speed. Dot-matrix printers are fine for some limited uses, but their poor resolution of arcs and circles, and problems with custom typefaces has relegated many dot-matrix printers to proof-copy machines.

Laser printers capable of graphics have found a much wider acceptance for paper hard-copy production. The minimum standard seems to be around 300 dots per inch for a full page of printout; this takes a full megabyte of memory in the printer. The only printer currently available with that much memory on board is the Apple LaserWriter. The Hewlett-Packard Laserjet Plus has ½ MB of memory, sufficient for a page of half text and half graphics. Several manufacturers have addressed this problem for the PC environment by producing add-on boards to increase the memory available to the printer. These boards are added to the computer, not the printer, and act as printer drivers. It should be possible to use add-on RAM in the Amiga in the same fashion, allowing access to several different laser printers. By the end of this year, color laser printers should be available.

Another popular form of hard copy is 35mm film. Shooting an image from screen is a crude but effective means of producing a finished image. The use of a film recorder, however, will give you results with much higher resolution. A film recorder is a device that accepts a video output signal from the computer, displays it on a self-contained, high-resolution monochrome monitor, and uses an additive exposure technique to make three consecutive exposures through red, green and blue filters. The internal monitor has a flat screen that eliminates distortion and linear curvature. Most systems can accept several types of video input: color composite, RGB digital and RGB analog. They also have the controls for adjusting the color balance for a particular film emulsion, and can often calculate the correct exposure automatically. Some will accept larger film formats, or instant-developing films. Some recorders are capable of interfacing to the computer through custom software to create a final image with a resolution greater than that of the host computer. Prices for film recorders start at around $1,500.

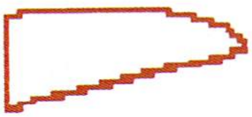
If the finished image is going to be reproduced in quantity, color separations may be necessary. ImageSet Corp. of Sunnyvale, California can produce color separations, or black-and-white text on a digital typesetter, directly from disk files created on an Amiga.

The Amiga is the first computer in its price range that can output a high-quality signal directly to a video recorder. This has given rise to several new types of business applications. Videotapes of slideshows created on the Amiga can be produced by someone with no special training, and more sophisticated users can add titles, overlays and special effects. Corporate produc- ►

tions can be accomplished with lower costs and shorter turnaround times than ever before. The VCR has become another device for producing hard copy, for moving images or sequential displays of stills.

The Means of Production

Two types of software exist for the production of business graphics: paint programs and drawing programs. Paint programs address the screen pixel by pixel, while drawing programs create objects and place them on the screen. Once you have drawn an object with a drawing program, you can pick it up, move it around, save and reuse it. Paint programs allow you to create objects also, but once they have been placed on a screen, they become part of the entire screen pixel map and are therefore no longer discrete objects. You can save a paint program object before you use it; however, once it is placed on a screen, it loses its separate identity. Paint programs are usually faster to work with in the sense that you can draw on the screen easier than creating each object separately, then switch to a separate edit mode and place them in their places. Some programs combine features of each type. Generally, paint programs are preferred for full-screen hand-drawn images, and drawing programs are more suited for the production of charts and graphs.



The Illustrated Examples

An excellent example of a paint program is Deluxe Paint from Electronic Arts. It has just about all of the features you could want in a paint program, including the ability to draw lines and geometric shapes, a large color palette, full support of the Amiga's system fonts, a magnify feature, custom brush creation, fills, grids and many other useful features. Its user interface is one of the best I have seen, allowing command selection by keyboard, mouse or any combination thereof. This allows the experienced user to work much faster than with the mouse alone. Electronic Arts will be releasing an accessory disk for Deluxe Paint with clip art, full-screen paintings and several utilities. A program to convert DPaint files to three bit-plane files, for use in other programs (Deluxe Print, etc.), and a slide show program for the viewing and displaying of files created with DPaint will also be released. The slide show program will be transferrable to any disk, allowing for the creation of stand-alone display disks.

Impact from Aegis Development is a structured drawing program, designed specifically for the production of business graphics. It runs in the 640 × 200 mode, and is an object-oriented program. It is used to create three types of images: Slides, which can be thought of as pictures; Frames, which are text screens; and Icons, which are symbols (not to be confused with the icons in Workbench). Slides are created by inputting data for a chart, then selecting what type of chart you wish to create. Pie, bubble, line and scatter charts are all menu items selectable with the mouse. Just select the type and Impact will do all of the calculations and create the chart automatically. An edit mode gives you access to some features found in a paint program: freehand drawing, lines, arcs, cut and paste, etc. The frame mode is used for the creation of text. All of the Amiga system fonts are supported, as well as what Aegis calls stroke fonts. Stroke fonts are vector-described fonts, as opposed to the Amiga's bit-mapped fonts. By describing a font as a set of vectors, it is much easier to scale text to any size. The frame mode, among other things, allows you to define an area, then enter text using a mini word processor and tell the program to fit the text to the area allowed—a very powerful feature. Fonts can be displayed as normal, outlined, drop shadowed or multicolored. The icon mode is used to create 32-pixel square symbols for use in either of the other two modes. These objects can be picked up and placed anywhere, or can be used as symbols in bar charts, stacked one on top of the other.

All modes work interactively, and finished slides can be resized and combined, with up to four in a single new slide. Also included is a powerful slide-show program. Once all of your slides are finished, the program will call a directory of your slide files and display their file names. You select the order in which you want them to be displayed, how they are to appear, how long each will be displayed and how they will disappear. Options include several different wipes: spiral, pop in, random and fade. The wipe in and out times can also be controlled. Since Aegis does not copy protect their software, you can create stand-alone slide shows.

Impact will also accept standard DIF files. This will allow you, for example, to import data from your spreadsheet program directly to Impact, and therefore greatly ease the creation of charts to support or explain results on the bottom line.

Since Impact stores images as a series of objects, its files are not directly compatible with other paint programs that use standard IFF format for full-screen images. Aegis has included an export option that will convert files to standard IFF format, but there is no way to do the reverse. An IFF file is a bit map, and does not include any information on discrete objects, so there is no way to import picture files from other programs that create bit maps.

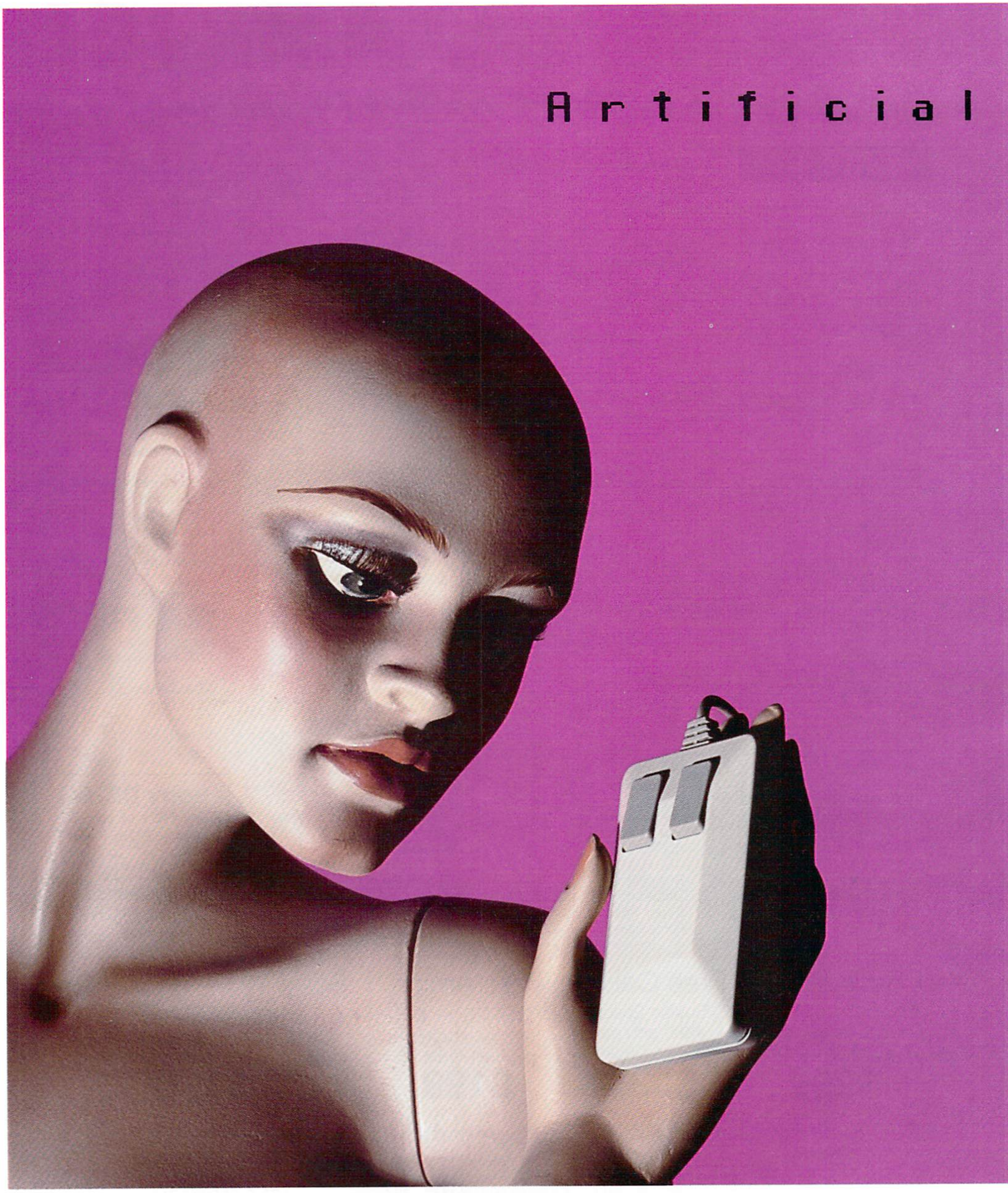
The Clincher

The use of graphic-design software can simplify the process of creating useful, inexpensive and yet powerful business graphics. Graphics can make communication clearer and quicker, and improve the decision-making process. Rather than trying to understand and juggle a series of numbers with information about the relationship between separate sets of data, a single and sometimes simple chart or graph can quickly convey the total picture. Business graphics can make business easier.■

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For an in-depth look at Electronic Arts' Deluxe Paint, see Abigail Reifsnyder's review in our March/April issue of AmigaWorld.

Artificial



Photograph by Edward Judice

Intelligence

By Daniel Zigmond

Expert Systems in the Business World

This is the first in a series of articles on artificial intelligence. Artificial intelligence, often abbreviated AI, is the study of making computers intelligent. It is not simply a branch of computer science, because it combines the principles of computer science with ideas taken from many other fields, including psychology, linguistics, philosophy and neuroscience. Not everyone involved in AI research is studying it for the same reasons. Some are simply trying to make computers more useful to people, while others wish to gain insights into the workings of human intelligence by creating simplified models.

Expert Systems

Some of the most useful pieces of software to come from AI research are *expert systems*. These programs store vast quantities of information on a specific topic and answer questions based on this information that normally would be reserved for an expert in the field.

Although they are usually very easy to use, expert systems are among the most complicated pieces of software on the market. Good expert systems are composed of three parts. They begin with something called a *knowledge base*. This is a huge library of data containing all the information that the system is going to use when answering questions about its area of expertise. Knowledge bases differ from conventional databases in size, the type of information they hold and how the data is stored. A database stores only pure facts like "The price of a wrench is $2.50" and "Cindy is 18 years old." Knowledge bases, however, can handle much less straightforward things, including cause-and-effect relationships, rules and "fuzzy facts" (i.e., imprecise data often dependent on probability). This data can include information such as "If the typewriter breaks, then call Pete's Repairs" or "If the typewriter does not work, it might need a new ribbon." In short, knowledge bases not only hold more complicated information than databases, but they can also understand even subtle relationships between the data.

Besides the data stored in the knowledge base, expert systems must have an *inference mechanism*, a second component that knows how to use basic problem-solving ►

◀ skills to interpret data in a meaningful way. It is usually based on the rules of symbolic logic and cause-and-effect. Much of the research in AI has been oriented toward developing more powerful techniques for writing these mechanisms; they are an essential part of any "thinking" machine.

The final piece of software necessary to make a complete expert system is the *user interface*. This interface employs a form of natural-language processor to take the words typed by the user and convert them into a list necessary to answer the user's question. Some expert systems require the queries be worded in a very precise way, but more advanced ones can interpret almost any English sentence.

Expert Systems for Business Users

The computer revolution has already had a tremendous impact on most businesses. For several years, many have been using word processors for writing reports, spreadsheets for financial planning, networks for interoffice communication and databases for storing information. Expert systems, however, now permit these companies to go a step further.

Expert systems are more economical than their human counterparts. Once the hardware and software have been purchased, there are no additional expenses except ordinary maintenance.

Expert systems can benefit a business in several ways. First, they expand the number of companies that can work in a given field. There are only a few experts in many fields, which creates a serious bottleneck, because companies can only begin a project if they know they will have an expert on hand to assist them with problems that arise. Expert systems allow a greater number of companies to enter new markets, because they can provide the necessary information to anyone who needs it.

A second advantage of expert systems is that they are more economical than their human counterparts. Once the hardware and software have been purchased, there are no additional expenses except ordinary maintenance. A third reason for businesses to use expert systems is that they are accessible 24 hours a day, seven days a week. Companies can become much more independent by keeping their experts on their desks.

Applications

There are many tasks that are particularly well-suited to expert systems. One of the simplest ways expert systems are being used in the business world is as intelligent tutors for training new personnel. The programs can print instructions on the use of a piece of office equipment, for example, then answer any questions the trainee might have. In this way, an expert system can even teach people how to use itself.

A more complex application of expert systems is the reading of financial statements. Financial statements are published yearly by most companies and describe all aspects of their economic well being, their total income, debts, loans, property, and so forth. It is necessary to have this information before doing business with a company, which makes financial statements extremely important in the marketplace. Unfortunately, they are very difficult for most people to comprehend. Financial statements can easily mislead inexperienced analysts who do not know the particular criteria that were used to prepare the statement or the tricks that can be used to hide unfavorable statistics. An expert system can store all the necessary background information in its knowledge base, interpret the financial statement, and then answer questions about the company or provide a full report of its findings. The system can supply the logic behind its answers, so the user can recheck them or use them to advise or persuade other executives.

A somewhat similar use of expert systems is in the management of a company's own finances. While no commercial systems are able to do this flawlessly at this time, researchers are working on systems that can accurately predict when it is wise to alter a company's portfolio and exactly what changes should be made to it. Such software will base its decisions on different economic indicators as well as the data originally fed to its knowledge base by an expert money manager. The main problem that has yet to be solved with these systems is how to represent the clues and tips that a human manager might pick up through his or her daily interaction with other people. Because of this shortcoming, current expert systems can only give reasonable advice; they cannot make actual business decisions. On the other hand, many people believe that current expert systems are already sophisticated enough to provide sound financial advice to individuals who earn from $20,000 to $50,000 per year. The software provides them with many of the benefits of an expert money manager without that expense of hiring one. These systems function much like those for large companies, but they need not be nearly as complex.

Expert sytems are very valuable tools for in-house publishing. They can move blocks of text and figures to achieve the best layout with much more speed and accuracy than most people. This allows users to write and edit documents without having to worry about the format of each page, to make last-minute revisions to their reports without having to send it back to the typesetter and to integrate illustrations into text without the aid of a layout artist. Expert systems are also able to spot and often correct errors in spelling and grammar to ensure that all final copies are flawless.

For some applications, the sheer speed of expert systems is sometimes their greatest advantage. Many databases contain thousands of pages of information that would take weeks for a researcher to read. An expert system can scan many volumes, looking for data that meets a complicated criterion in much less time. Unlike conventional database management programs, expert systems do not simply analyze each piece of information in their knowledge base to find a particular item. Instead, they are able to use their inference mechanisms to select which portions of the data they need to explore. For example, if a user asked where it was possible to purchase lemons, the system would not check the inventory of every store in the area as a normal database manager might, but it could deduce that

because lemons are a type of fruit, it would only be necessary to consider stores listed under "Grocers" in the yellow pages.

Finally, expert systems are well-suited to the office because, unlike most other office-automation software, they can be easily tailored to meet a company's needs. They can keep a calendar based on information such as "Mike usually plays golf on Wednesdays, unless there is an emergency" or "There is a staff meeting every Monday from 4:00PM to 5:00PM unless it is a holiday, in which case the meeting is on the following day at the same time." Once such data were entered into the system's knowledge base, the system could respond to a question like "Where is Mike?" with the answer "Since it is a Wendesday and there has not been an emergency, he is probably playing golf," or "Since it is Tuesday and yesterday was a holiday and it is between 4:00PM and 5:00PM, he is at the staff meeting." It can remember general rules like "All calls about Amiga hardware go to Jim" and "All calls about Amiga software go to Bob." When a customer calls about a product, the person answering the phone would only have to query the expert system to find out who should be contacted. The possibilities are limited only by the user's creativity.

Expert Systems on the Amiga

Only a sampling of the possible applications of expert systems in the business world have been presented here, but they should be sufficient to illustrate that expert systems are among the most advanced tools available for companies today. They have recently begun to appear on many personal computers, making them attractive even to small businesses. Possibly the most significant development toward the availability of such systems on the Amiga has been the release of Cambridge Lisp 68000 by Metacomco. (See "Programming on the Amiga: Cambridge Lisp 68000" in the January/February 1986 issue of *AmigaWorld* for more information on this product.) This language was designed specifically for the production of software that, like expert systems, makes use of the methods developed through modern AI research. This software, combined with the many advanced features of the machine, means that these powerful tools for the business world will probably be available for the Amiga in the near future, and that is certainly something to look forward to.■

Address all author correspondence to Daniel Zigmond, Carnegie-Mellon University, Computer Science Dept., Schenley Park, Pittsburgh, PA 15213.

This article is dedicated to the memory of Marjorie Marks, a late teacher of mine who was an expert on many things.

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Worksheet Magic

Nothing is left out of the workings of the worksheet. Ranges of cells can be named for convenience; column widths are variable; the screen can be split into two windows; titles can be frozen; contents of cells may be copied or moved; the worksheet may be altered as a whole or only partially; the list goes on and on. Perhaps most important, Professional can use and save Lotus 1-2-3 files for transfer between computers.

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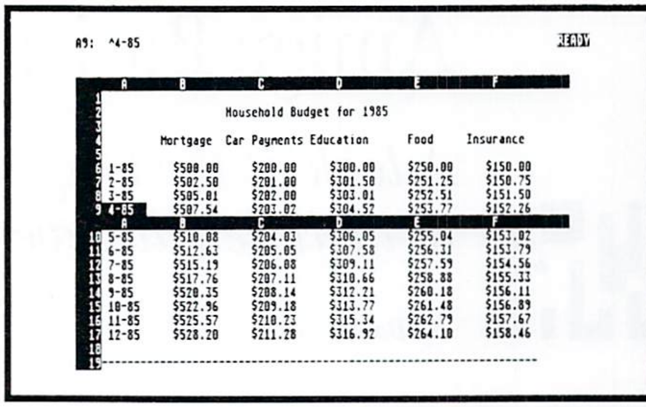
The graphing capabilities of Professional are astounding. Not only are there six completely different types of graphs available, there are tens of ways to manipulate the data, titles, grids, colors, legends, keys, and scaling of the size of the graph.

Macros

Professional also includes sophisticated macro programming commands. With several special macro commands, the user can actually *program* Professional to be dedicated to a specific task such as accounting.

Just Minutes to Learn

Professional is as easy to use as it is powerful. It comes with a user-sensitive tutorial for the newcomer. And help is built right into the program. With the handy tutorial, you will be able to create professional worksheets in just minutes.

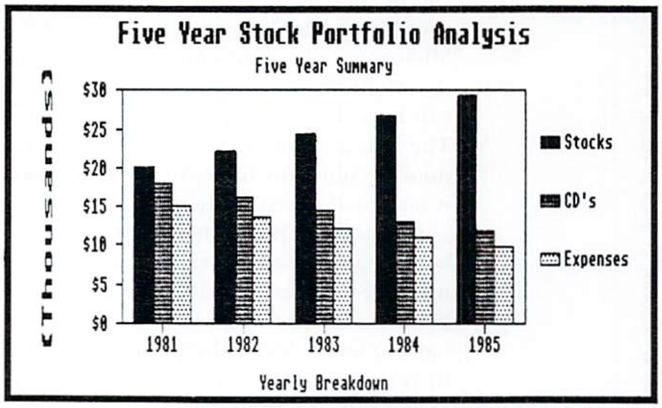


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Amiga Basic: An Overview

A look at the language that Commodore has chosen to include with every Amiga.

By Bob Ryan

Microsoft Basic (MBasic) is as venerable as a product can be in an industry that is barely ten years old. Its roots are in the Basic that Bill Gates, Chairman of Microsoft, helped develop for the first microcomputer, the Altair 8800. Its various incarnations include Applesoft Basic for the Apple II and BasicA for the IBM PC. The lastest scion of the MBasic tree, Amiga Basic, is now the standard Basic for the Commodore Amiga, and it may be the best of the lot.

Amiga Basic is a high-level language, so called because one Amiga Basic instruction translates into many of the machine-language instructions understood by the computer. With high-level languages, you don't have to worry about the peculiarities of the processor in your computer; you can devote your programming energies to the problem at hand.

Amiga Basic uses a program called an interpreter to translate Amiga Basic instructions into machine code. Other languages normally use a program called a compiler to translate their instructions into machine code. The type of translator used is fundamental in defining the nature of the language.

Interpreters and Compilers

When you write a program, whether in Basic, Pascal or C, you are creating source code. Source code consists of English-like (and not so Enghlish-like) statements such as Print and Append that tell the computer what you want it to do. Of course, the computer doesn't understand source code, so every language has a translator that turns source code into object code.

An interpreter is a program that translates source code "on the fly." When you run an Amiga Basic program, the interpreter translates and executes the program, one line at a time. That is, it translates and executes the first line of the program, followed by the second line and so on until the program ends or a fatal error is encountered.

A compiler is a different sort of beast. Like an interpreter, it translates source code into object code. Unlike an interpreter, however, it does not execute the object code. Instead, it saves the object code to an object file. Normally, this file is then linked with standard library functions to create an executable file or module. To actually run the program, you have to instruct the computer to run the executable file.

Each type of translation program has its advantages and disadvantages. Because compilers separate the translation process from the execution of the program, compiled programs run faster than interpreted ones. Also, compilers eliminate redundant translation. If you have a loop that is executed 10,000 times in a compiled program, each line of the loop is translated only once during the compilation process. With an interpreter, each line of the loop would be translated 10,000 times—once for every time the loop is executed.

The advantage of interpreters is that they are easy to use. Often times, linking and executing compiled programs is a very tedious task. Interpreters eliminate these steps. It is also much more convenient to modify and debug an interpreted program. When you run an Amiga Basic program, you get immediate feedback about logical and syntax errors. You can then incorporate corrections immediately.

Amiga Basic shares the strengths and weaknesses of all interpreted languages, although some of the weaknesses are partially mitigated by the Amiga itself. Because the Amiga is a fast machine, and because of its ►

specialized graphics hardware, Basic programs usually run faster on the Amiga than comparable programs on other personal computers.

Crafting Programs

Microsoft has provided some very nice tools to help you create programs with Amiga Basic. The most important is the full-screen editor provided with the language. The editor lets you enter and modify programs with ease. In comparison to some Basic implementations, such as Applesoft Basic, the Amiga Basic editor is a boon to programmers, not a hindrance. Using the editor, you can change lines, move sections of your program around and even format your listing to reflect the structure of your program.

In addition to the Basic editor, Microsoft provides an object editor with Amiga Basic. Using this tool, you can create sprites and bobs for graphics animation programs. Amiga Basic also provides a number of commands to manipulate the objects created with the object editor. With the object editor, graphics animation is no longer the exclusive domain of assembly language programmers.

The New Basics

In addition to strong program development tools, Amiga Basic includes many advances over earlier microcomputer Basics. Specifically, Amgia Basic contains a number of features that promote and support the concept of structured programming.

Essentially, structured programming is a method that allows you to write programs that are easy to understand and modify. For many years, the Basic language has been vilified, with some justification, for encouraging the use of programming techniques that lead to "spaghetti code"—programs whose logic is incomprehensible, even to the programmers who write them.

Structured programming attempts to avoid "spaghetti code" by encouraging programmers to break their programs into pieces, with each piece representing a single, logical task that the program must perform to complete its job. Programmers then string these pieces, called modules, together to form programs. In addition to being easier to understand (and therefore to modify), modules are reusable. Since you write them to perform single, low-level tasks, you can usually use many of the same modules in a number of different programs. Having a library of modules on hand can greatly ease the pains of program development. You don't have to keep reinventing the wheel.

Amiga Basic supports structured programming on a number of different levels, from the ability of the editor to indent program lines (which helps illustrate the structure of the program) to the ability to call ROM kernel routines (thereby using modules that someone else has already written).

Primary support for structured programming with Amiga Basic comes from the following features:

1. *Named subroutines.* These permit you to distinctly label the parts of your program.

2. *Subprograms.* You can call three types of subprograms: Basic subprograms incorporated in the program source code, machine-language subprograms that reside at a known address and named subprograms from

A Tale of Two Basics

If you bought your Amiga before the release of Version 1.1 of Kickstart and Workbench, you're aware that Amiga Basic wasn't the first Basic bundled with the Amiga. Originally, the Amiga was sold with ABasiC, developed by Metacomco. Since ABasiC was further along in development than Amiga Basic at the time of the Amiga's release, it was included with the machine instead of Amiga Basic.

The case of Amiga Basic and ABasiC is just one example of an unusual strategy that Commodore employed during the development of the Amiga. In many instances, Commodore commissioned more than one version of a product in order to help insure that at least one of the versions would eventually be released. Given the vagaries of software development, Commodore did their best to see that the library of Amiga software would include at least one example from the major categories of software.

Although ABasiC was shipped with the first Amigas, it proved to be a disappointment. It had a primitive line editor, lacked support for graphics animation and was plagued with a number of bugs. It was a product that was released "before its time," as the late Orson Welles might have put it.

When Version 1.1 of the operating system was ready, Commodore decided to replace ABasiC with Amiga Basic. This is probably less a reflection of the problems with ABasiC than it is an acknowledgement of the fact that Amiga Basic is a product of the largest system-software company in the microcomputer field. Microsoft is simply better known than Metacomco and is therefore a bigger draw for people considering the purchase of an Amiga.

Whatever Commodore's reasoning for switching to Amiga Basic, consumers certainly haven't suffered. On the whole, Amiga Basic is a better language than ABasiC. Commodore made the right choice.

Where does this leave ABasiC? Nowhere, apparently. Commodore has no incentive to support two similar versions of Basic for the Amiga, and it is doubtful that either Commodore or Metacomco would want to release ABasiC as a stand-alone product. Not many people will pay for a product when they get a similar one for free. Consequently, it looks as though ABasiC will remain on the shelf for the foreseeable future. ■

defined libraries. Calls to external subprograms are made using C-language conventions. Subprogram variables can either be kept independent from or shared with the main program.

3. *Device independent I/O.* Characteristic of UNIX systems, device independent I/O lets you treat hardware devices as files. You can write to printers and modems as easily as you can write to a disk file. Hardware devices are a lot easier to deal with when you can treat them all alike.

4. *Advanced control structures.* In addition to If...Then and For...Next loops, Amiga Basic also supports While...Wend (While End) and block If...Then...Else structures. Amiga Basic lacks a Case statement and a Repeat...Until loop.

Using these features, you can write cleaner, more easily modifiable programs in less time than it takes to get "spaghetti code" to run.

The Amiga's Kinda Special...

No language for the Amiga would be complete, of course, if it didn't take advantage of the special features of the machine. Amiga Basic does this ably, giving you access to many of the sound, speech and graphics capabilities of the Amiga. These include:

1. *Text and phonetic speech synthesis.* You can make your Amiga speak. It can speak string constants and variables, or you can construct more phonetically-correct sequences.

2. *Amiga sounds.* You can make music or just about any sound you like with Amiga Basic. You can even do it in stereo.

3. *Graphics and animation.* Amiga Basic lets you plot lines, circles and rectangles in a myriad of colors, and, as mentioned above, it lets you control objects used in animation.

4. *Menus, windows and the mouse.* Amiga Basic makes it easy to accept input from the mouse for your programs and to create Intuition-like screens and menus. You can give your programs a professional look.

Including special features in a language is a double-edged sword. While it gives you greater control over the machine, it cuts down on the portability of your programs. If you want to develop programs that run on the Macintosh or IBM PC as well as the Amiga, you will either have to eliminate special features or be prepared to do a lot of customizing after you've moved the source code over. The one nice thing about Amiga Basic in this regard is that it is a Microsoft product. Much of the language is identical to MBasic for the Macintosh or for the CP/M machines.

Until Next Time

That, in a nutshell, is Amiga Basic. In future issues, *AmigaWorld* will delve deeper into some of the more exciting features of the language, particularly music synthesis and graphics animation. There's enough in Amiga Basic to keep you occupied for a long, long time.■

Address all author correspondence to Bob Ryan, c/o Amiga-World *editorial, 80 Pine St., Peterborough, NH 03458.*

Call For Authors

The magic was almost tangible in the haze created by the smoldering candles. Seven black candles at each point of an oddly shaped star. Cryptic symbols scratched in the surface of a blood-encrusted altar. There was no moon that cold night and no other humans within screaming distance.

The man-witch lifted his dark arms to the sky and chanted in an eerie, almost ghostly voice. Rhythmic, repetitive, monotonous chanting to demons, spirits and evil beings deep in the pits of hell.

Silver and red electric sparks began to dance on the outstretched fingers of the man-witch, and on the altar before him, a nebulous figure began to materialize. At first it took on the appearance of a miniature naked woman, but it soon rose up into the dark sky and towered above the man-witch in its true form. With slavering fangs and iridescent scales, the incarnation of evil glared down at the mortal with hate. Its fetid breath stank of disease and sulfur.

"Your command, Master?" the beast roared.

The man-witch reached into his robes, drew forth a handful of papers and handed them to the beast. The creature glanced at the papers and frowned. The first page contained the man-witch's true name, address, social security number and phone number. The following pages contained an article of interest to Amiga users.



The beast glanced through the neatly typed, double-spaced pages, then looked at the man-witch.

"What would you have me do with these, Master?" the beast snarled.

"Deliver this article to:
AmigaWorld
Submissions
80 Pine St.
Peterborough, NH 03458,"
the man-witch commanded, "and make sure that the editors buy it! Otherwise, destroy them!"

"Did you send for the author's guidelines?" the beast asked.

"I have no need for guidelines!" the man-witch cried.

"But Master...," the beast started.

"Do as I have ordered!" the man-witch snapped. "Nothing can stop me from publishing this Amiga article."

The beast shook its fearsome head and vanished.

Six or eight weeks later, the man-witch got his article back with a rejection notice that read:

"Good article, but not good enough for AmigaWorld. *P.S.: The beast was delicious. Signed, The Editors."*

So if you believe, truly believe, that by whatever arcane methods, you can devise an article worthy of publication in AmigaWorld, *then by all means, send it in. But be forewarned, there are few things on the face of this planet, or beneath it, meaner than an* AmigaWorld *editor.*

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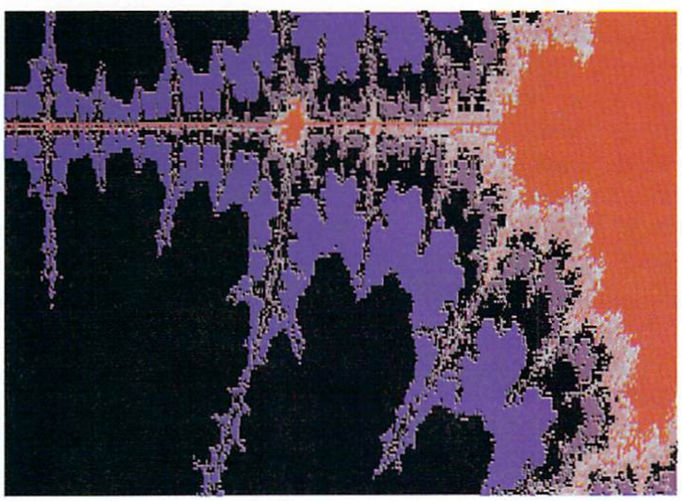
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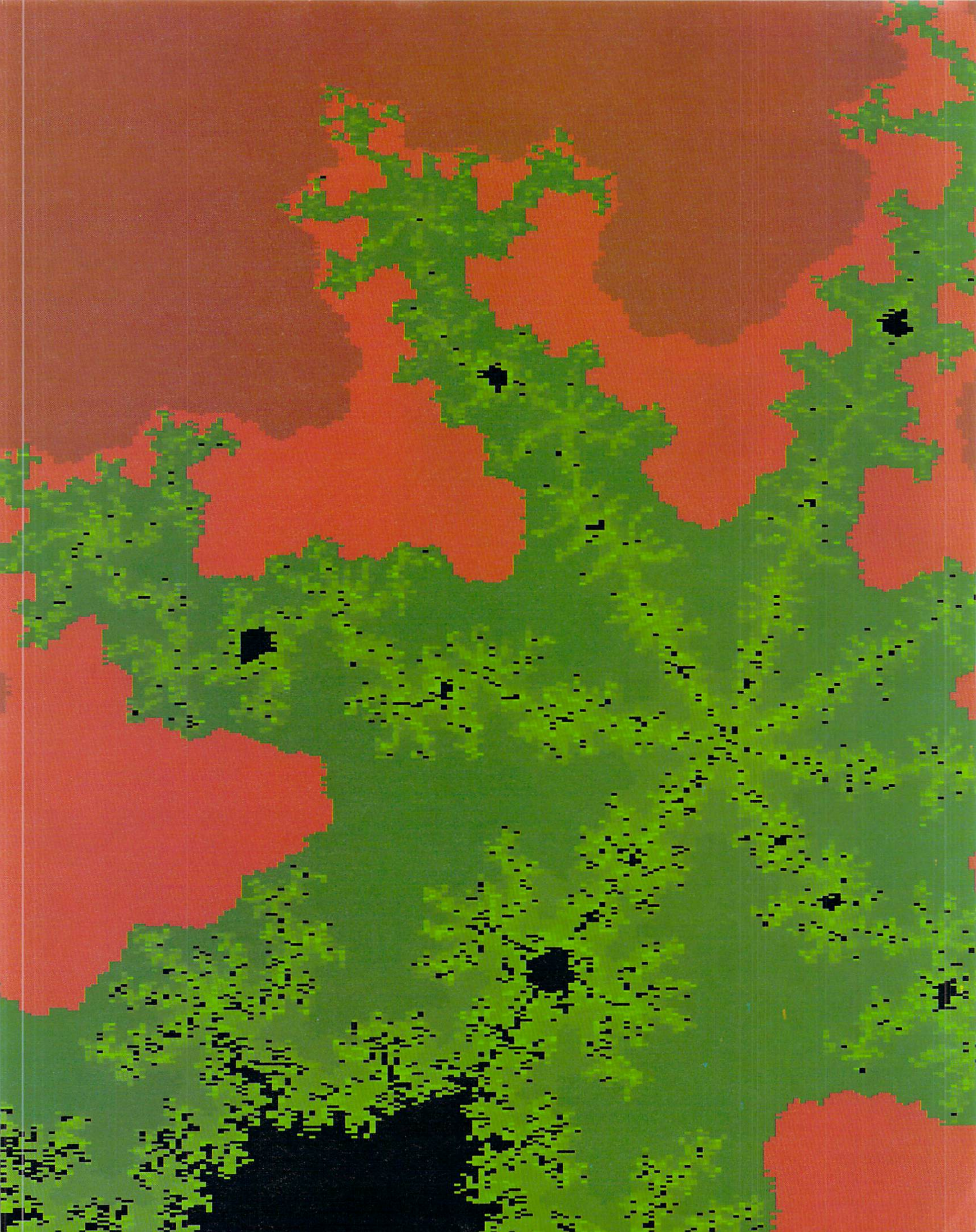
Digital Canvas

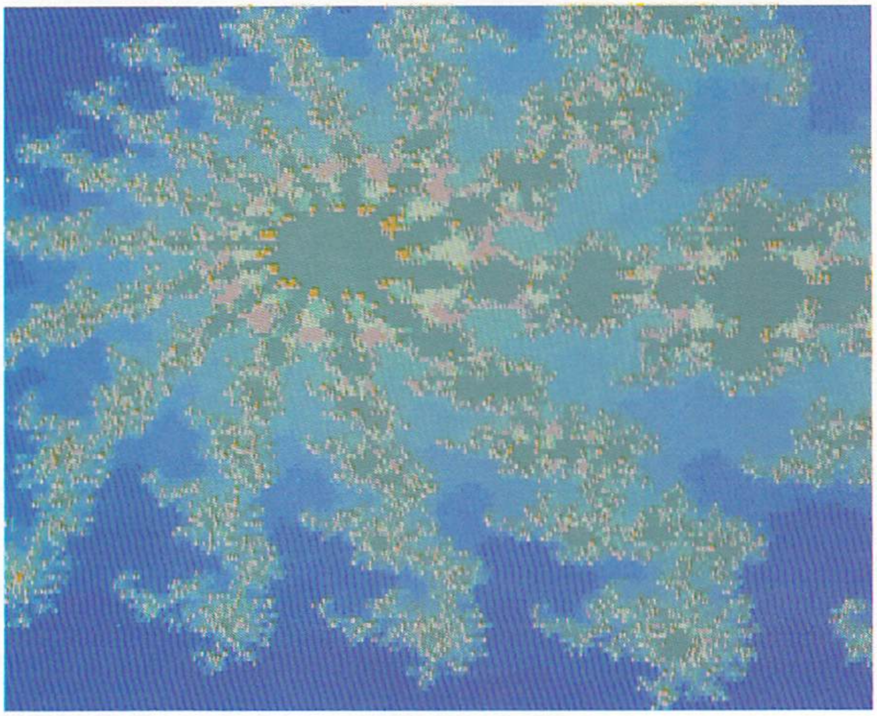


This month's Digital Canvas features mathematically-generated graphics called Fractals, created from the Mandelbrot Set. Mathematician Steve Bonner, who produced these images, feels they are ample "evidence that math and art are inherently linked, and ought never be separated." Leonardo would have agreed.

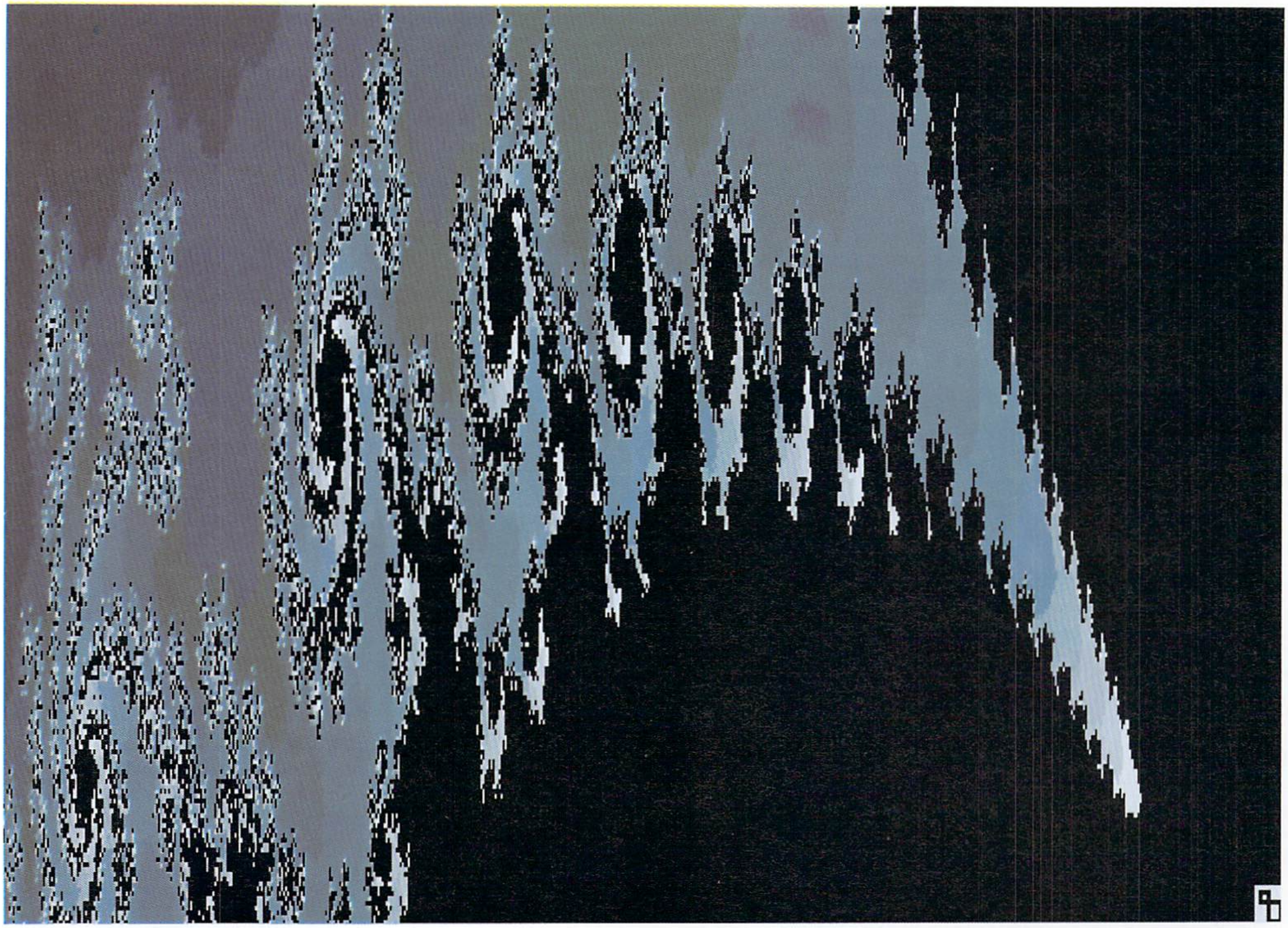
Steve Bonner, a long-time resident of Rockville, Maryland, received his undergraduate degree from the University of Maryland, and his Master of Arts in mathematics from The American University in Washington, DC. A serious student of analytic number theory, Steve recently was led to the so-called Mandlebrot Set through investigations in complex analysis. It is his conviction that if "the student of mathematics cannot either literally or figuratively picture what it is he's studying, then all attempts at understanding are futile."

Steve has pursued his interests with the Amiga, and submitted these images with remarks about his satisfaction that he no longer needs a mainframe or elaborate graphics hardware to study two- and three-dimensional objects with accuracy. We hope these pictures give you a feel for the intricate and complex beauty that can be visualized through the language of mathematics, whether or not you ever really learned to speak it. ■









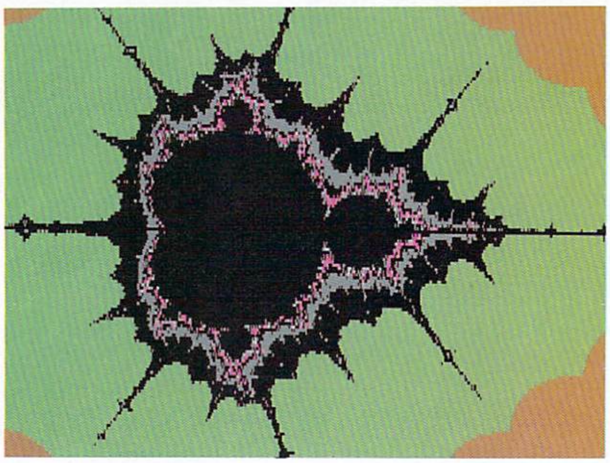
Fractals and Mandelbrots

By Bob Racko

Fractals get their name from their observed characteristics. Fractals occupy a fractional-dimension, for instance, somewhere between 1d (a line) and 2d (a plane). To qualify as a fractal, you have to nearly fill up all the space between one dimension and another.

To pull this off with a line requires a curve in the line (or fold) that follows a very crooked path and doubles back and forth without crossing over itself. The ratio of area covered this way versus the length of the line gives the "fraction" of the fractal.

Fractals also have another observable characteristic—no matter how much you enlarge them, there is always more detail available. For this reason, fractals are chosen to model such things as shorelines, mountain ranges and even noise. A single fractal generator can generate an infinite variety of self-similar forms that hold up well under enlargement.



Sometimes this fractal characteristic of enlargement gives an almost exact replica of some outer structure. A curved line that contains a number of subcurve copies has a special name—a "Peano curve."

The Mandelbrot Set

The theory behind the Mandelbrot set comes from the discovery that certain polynomials in the complex plane develop symmetric fractal behavior when iterated over a finite range.

That's a mouthful. In plain English, this means that you can make a pretty picture showing patterns of infinite sub-symmetry if you take a simple formula like this:

$$Z = Z * Z + C$$

where Z is a complex number, initially 0, and C is an initial real-x, imaginary-y point, and map out the border of all points where Z refuses to grow larger than a certain size. The border is a fractal pattern.

Programming Issues

Among the various Mandelbrot plotting programs, a simple standard holds in order to help the "explorers" communicate interesting border areas on the complex plane to one another. Areas of interest are given by their southwest corner and side. The southwest corner is typically the lower-right corner of a square area and the "side" is the length of a side of that square.

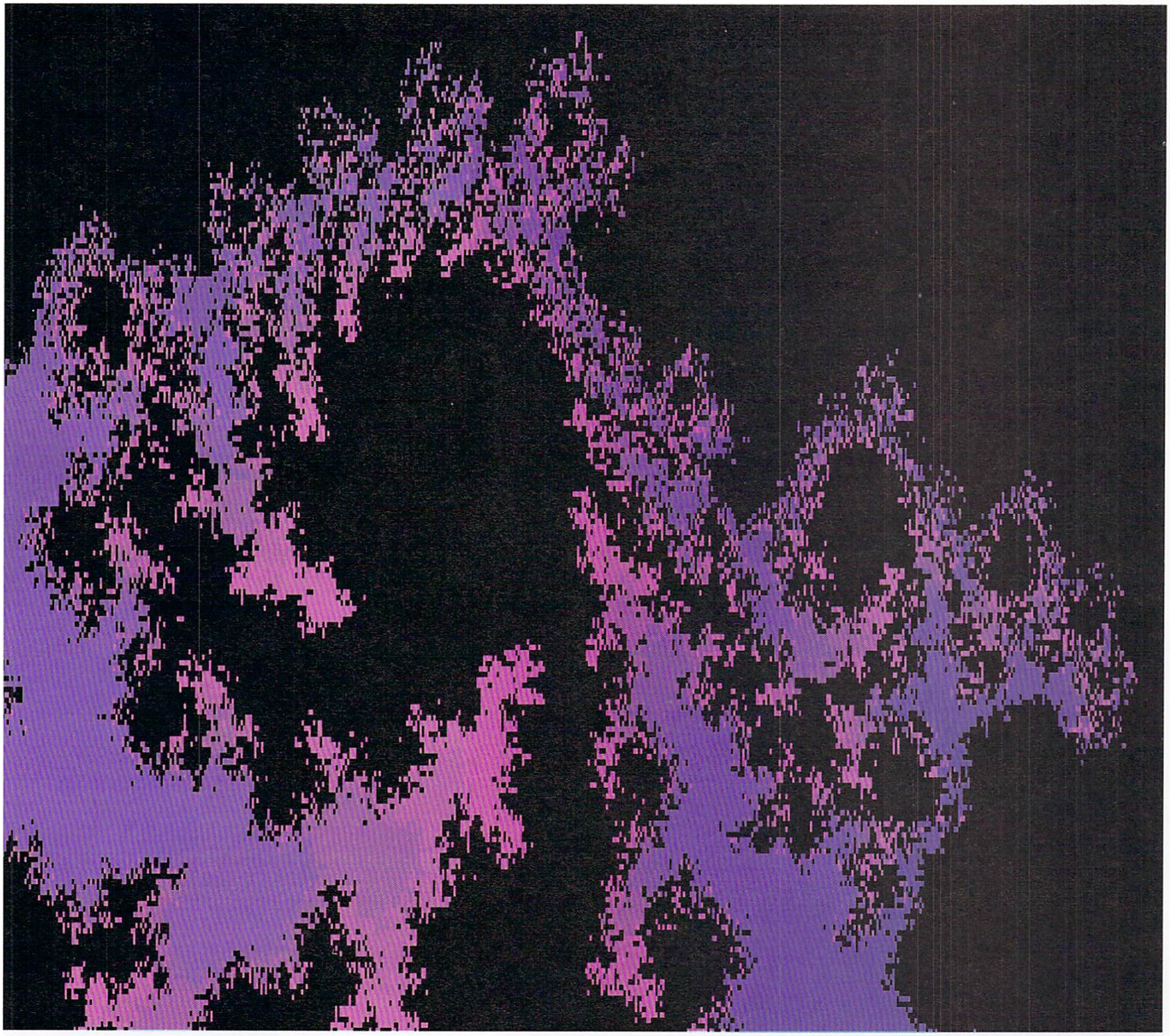
Another term bantered about by Mandelbrotonians is called the gap. The gap for a given picture tells the distance between two adjacent pixels (assuming everybody uses raster graphics). The gap is computed by dividing the side factor by the number of pixels available in one direction.

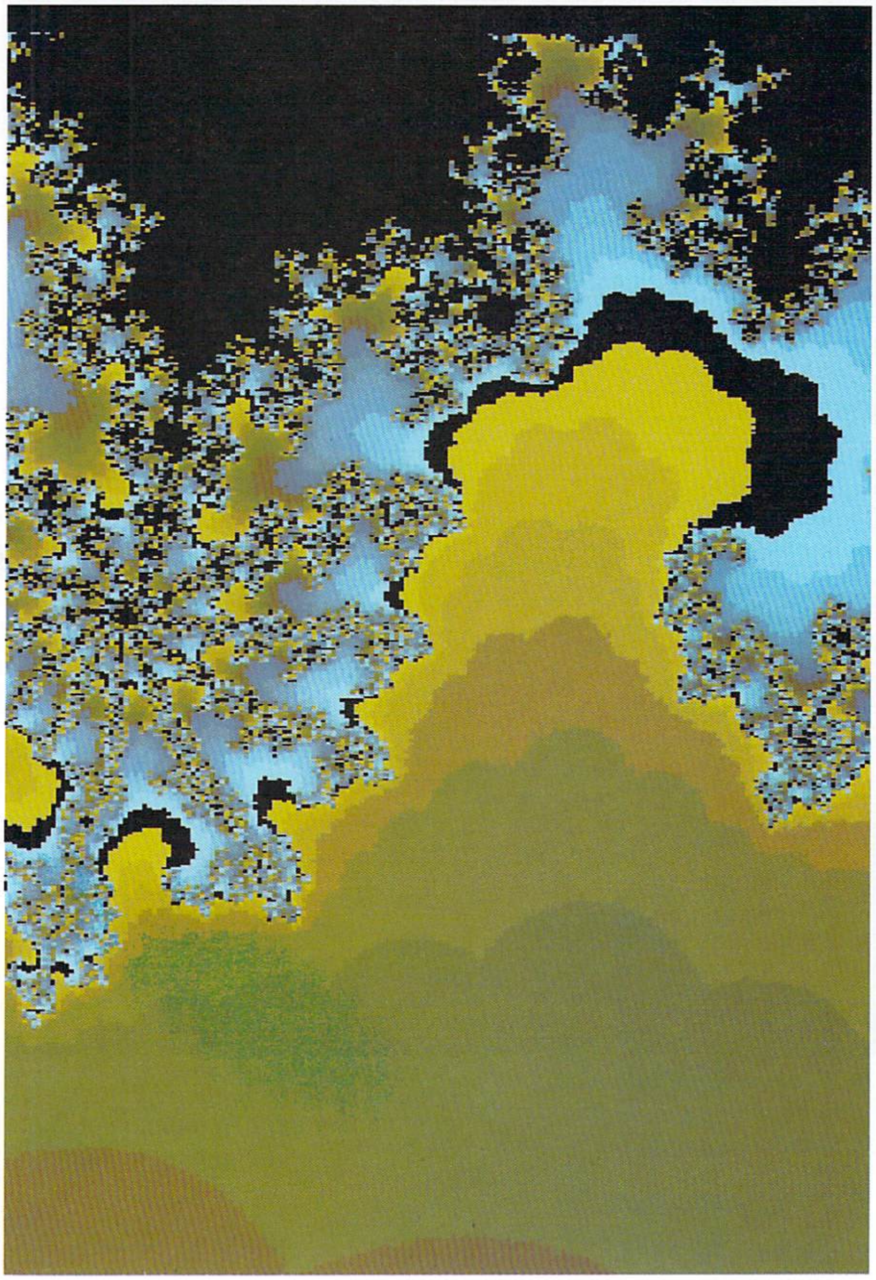
Many of the programs developed so far plot every point over a given (x,y) area and set an arbitrary limit to the number of iterations on a given point. Values that come out larger than some maximum length (usually two) before the iteration limit is reached are assigned a color based upon the number of iterations completed. The method for selecting a given point can be random if the random number generator can be guaranteed to deliver all possible values (the linear-congruential ones do).

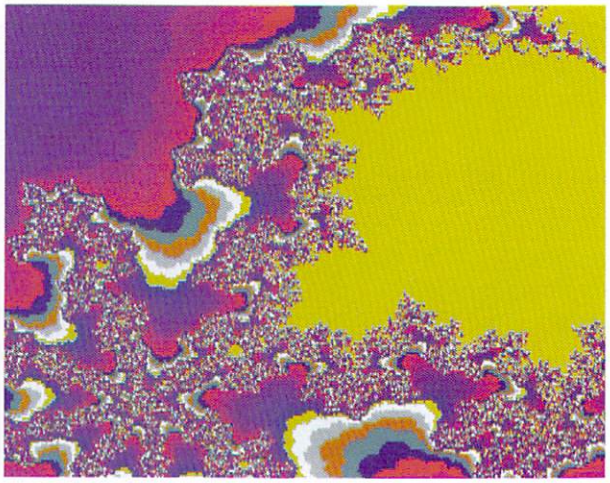
Other, more complicated programs find a point that is "in the set" (i.e., runs out of iterations or fails to grow enough to make a difference) and another point, next to it, which is "not in the set" (i.e., gets too big) and then check points to either side to trace the outline of the boundary.

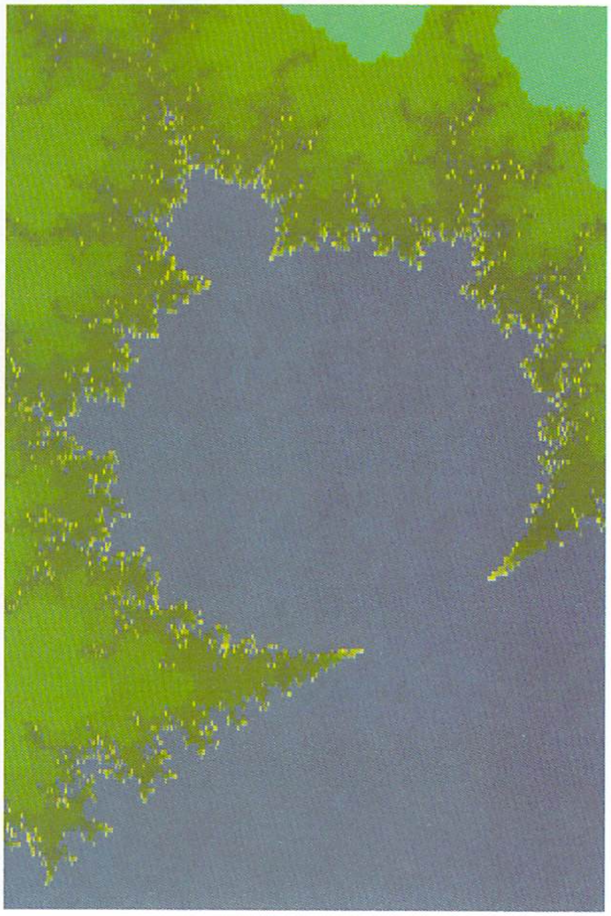
All these programs take quite a lot of time to run because they try many points on the plane. They have to—the Mandelbrot set border is more than a line; it covers an area in fractal form, zig-zags and all. Naturally, there is a frenzy of programming activity devoted to reducing the time required to either plot all those points or deliver a reasonable (but grainy) picture for further zooming. This currently can vary from 12 minutes to 12 hours depending on implementation features such as language used (Basic, Basic with Asm routines or C language) or plot algorithm (Straight Forward For Loop, Random Points, Curve Trace) and the ratio of in-set versus not-in-set points.■

Address all author correspondence to Bob Racko, Boston Computer Society, Amiga User's Group, PO Box 1064, West Acton, MA 01720.









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Basic and Before

By Vinoy Laughner

Being a brief and concise discourse on the origin and progress of Beginners All-purpose Symbolic Instruction Code, with assorted ruminations by the author.

In the chapter on Electronic Language in J. David Bolter's book, *Turing's Man*, an obvious but important observation is made, namely that "a computer program is written for two very different kinds of readers: the computer that executes it and other human beings who may need to read and revise it." This article is about the history of a programming language that was conceived in the light of the above reality: Basic. Basic was born out of a strong desire to bridge that gap between what computers understand, namely electrical current represented by binary digits, and what humans understand, namely (at least in this context) words.

Baby Basic

Basic was born in Hanover, New Hampshire on May 1, 1964, at 4:00AM. John Kemeny and Thomas Kurtz, mathematics professors at Dartmouth College, along with a handful of students, created Beginners All-purpose Symbolic Instruction Code specifically for use with their pioneer project in computer time sharing. (Before this breakthrough, computers served one person at a time through a procedure called *batch processing*, the programming usually done in Fortran. Individuals would schedule time to feed in their *batch* of punched cards; after all the hassle involved they would usually get results, as Kemeny relates in his book *Back to BASIC*, like "Illegal instruction on card 27." The debugging process often took days.)

Not only did the Dartmouth group make time sharing a reality, allowing more than one student at a time to use a computer, but to take advantage of the system, they also invented Basic. The fact that within a few decades millions of people would be using their new language (or a dialect thereof) on computers large and small, was something they never remotely anticipated. For Basic was originally designed for large GE computers; as of 1964, microcomputers were still about a decade away.

Dartmouth's new time-sharing language ran on two GE computers and borrowed features from Fortran and Algol, early high-level languages developed in the late fifties. It was decided that this new language should be easy to understand, for "beginners," (for purposes of education and interaction with the computer) and easy to find one's way around in, making the location of errors easier. These problems were addressed through the use of common words as commands and the use of line numbers. The original Basic was a *compiled* language, as have been all versions of Basic developed at Dartmouth since, as well as the Basic now available for micros by Kemeny, Kurtz and associates called True BASIC. (See the accompanying sidebar.)

Basic Leaves Home

Since the development and growth of Basic was accomplished partly through the generosity of General Electric (who in 1966 supplied Dartmouth with a GE-635 computer for help in setting up a GE time-sharing system), GE ended up with their own time-sharing system using what was called "GE Basic."

When the symbiotic relationship between Dartmouth and GE ended in 1969, GE was using Dartmouth's Version 6 Basic. (They are now at Version 8.) GE Basic became the springboard for other large-machine Basics, and as it found its way through the Hewlett-Packard HP-2000 and the Digital Equipment PDP-8, became the branch to other future Basics, notably, microcomputer Basics. Kemeny and friends argue in their book *Back to BASIC* that Basic Version 6 was "inferior stock," and therefore Basics that grew from it have inherent problems. They are also almost exclusively *interpreted* implementations, often sacrificing accuracy for speed, are mostly unstructured, encouraging "spaghetti code," and are all limited by the specific hardware they were designed for. (Pascal has fared well against Basic because of its portability.) As the inventors of the language, they have the right to be purists; they have a highly developed philosophy of what their computer language should be. It must be remembered, however, that those other Basics include Microsoft Basics (all flavors), the most popular and proliferated Basics in the world.

Little Computer Basic

The first commercial micro to use Basic was the Altair 8800. It made its debut in 1975. The hardware was the creation of Ed Roberts, a retired engineer with a small company, MITS, in Albuquerque, New Mexico. Altair 8800 Basic was written by Bill Gates and Paul Allen, who later founded Microsoft. Altair Basic was loaded into the machine through a paper tape reader and involved toggle switching, a common practice before keyboards. Getting Basic up and running on the Altair took between 20 minutes and one hour. Still, Basic on a micro was a truly historic event. Before long, practically every micro on the market would come with

Basic "built in." And Microsoft wrote most of the implementations.

When Steve Wozniak proudly presented his first "Apple" to the Homebrew computer club in California, he demonstrated it with a Basic program he had written. In fact, he designed the hardware after first writing Basic code for the MOS 6502 microprocessor. A colleague had tested his programs on a Hewlett-Packard that could simulate the 6502. Onlookers at the meeting were astonished that Basic would fit on such a small machine. Before long, his computer, along with Radio Shack's TRS-80 and Commodore's PET, made microcomputers household words, not to mention pretty commonplace items, and made Basic the one computer language most people had heard of, if they had ever heard of any. Elementary school kids were programming their computers in Basic and most colleges offered courses in the language as lower-level math courses. The TRS-80 and the Apple II Plus came equipped with versions of Microsoft Basic, soon making Microsoft a software company of monolithic dimensions. Microsoft's Basics (and DOSes) represent a huge segment of the market, and have become the defining standards.

The Persistence of Basic

I was recently walking through the library of a local college and noticed their Computing Room; rows and rows of computer stations outfitted with computers that, when turned on, immediately draw the users into the world of Basic. Later the same day, I read an essay by Seymour Papert (the father of Logo), in which he complained about Basic's widespread use, regardless of its weaknesses. He said, concerning Basic, "once enough people learn something, the social cost of change becomes too great, even if a better way that will produce better results exists....The only reason for the continued use of Basic is its social implantation." (In *The Computer Age: A 20-Year View*, MIT Press.) It is nevertheless apparent that Basic, whatever its limitations (of which I am no judge), is still a powerful force in the world of computing. New computers like the Amiga still come with a "free" Basic, even if it isn't built in. Many people will never communicate with a computer in any other language than Basic.

The history of Basic, as with all related digital computer history, condensed into a few decades, is still being written. Basic has not lost its value, appeal, or its significance in the gap between what computers understand and what people understand.■

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True BASIC

The release of True BASIC for the Amiga gives Amiga owners access to one of the few *truly* portable languages available for microcomputers. True BASIC is a structured language that conforms to the proposed ANSI standard for Basic language implementations.

The Amiga version of True BASIC is the third version of the language released by the Hanover, NH company whose founders include John Kemeny and Thomas Kurtz, the inventors of Basic. True BASIC Inc. first released the language for the IBM PC and recently released a Macintosh version. One of the prime attractions of True BASIC, especially to schools and large organizations with a variety of personal computers, is the fact that the syntax of the language is identical in the three versions of the language. Moving a True BASIC program from the IBM PC to the Amiga or the Macintosh requires very little tweeking.

True BASIC will also appeal to technical programmers who can take advantage of its built-in matrix commands and to anyone who needs the speed provided by its fast floating-point operations. It contains control structures, such as Select Case, that are not present in Amiga Basic. It also provides complete support for recursion.

Because it is designed as a portable language, True BASIC doesn't support some of the unique features of the Amiga such as animation with Vsprites and bobs. It does, however, support 2-D color graphics and multiple windows.

The heart of the True BASIC system is the compiler. Since it is memory resident, the compiler is very fast. It reports syntax errors and check parameters before program execution using easily understood messages.

The True BASIC compiler doesn't produce object code; rather, it produces a compact, intermediate code called b-code. The b-code is then executed by an interpreter when you run the program. Using this scheme (first popularized in the UCSD p-System), the developers of True BASIC made it easier to get the language up and running on a variety of machines, thus ensuring the portability of the language.

In an upcoming issue, *AmigaWorld* will review True BASIC and compare it to Amiga Basic. We'll try to answer a fundamental question about True BASIC for the Amiga: "Should you purchase a Basic language for your Amiga when Amiga Basic is bundled with the machine?"■

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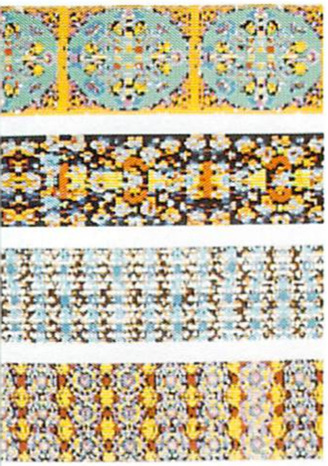
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Creating Fill Patterns With Deluxe Paint

For Deluxe Paint aficionados, here's a method for creating fill patterns of any height and width.

By David Shapiro



The "deluxe" in Electronic Arts' Deluxe Paint is certainly no exaggeration. For under $2,000, you can now put together a paint system that compares favorably to those costing ten times as much. And yet, though it has many features never available before on any home computer, there's one thing from my wish list that is missing. While the ability to define your own brushes allows a limitless range of multicolored textures for most of the commands, the Fill command will only work with the base colors.

There is a way to work around this limitation, though. While most paint systems provide fill patterns of a fixed size, the method presented here allows you to create fill patterns of any height and width, due to the marvelous flexibility Deluxe Paint allows you in changing the grid size.

Defining the Fill Pattern

The first thing to do is define your fill pattern. Think of it as a rectangular piece of floor tile. You should make sure that the right and left edges of your tile will fit together smoothly, as well as the top and bottom. To get the most detail, it's best to use the Magnify option. If you're just trying to create a texture, you may prefer to use the airbrush, possibly with the Smear or Blend options. Once you've got the texture you want, you can grab a rectangular section of it to act as your fill pattern.

Because the grid tool will plot your pattern with a slight overlap, you need to make it one dot taller and wider. Duplicate the left edge on the right-hand side of the rectangle, and the top edge at the bottom. Whatever color the upper-left dot of your pattern is should also go at the lower right, to complete the rectangle. This also is best done in Magnify mode. Unless your pattern is small, you should probably use the brush-selection tool to do this.

If you have 512K, you should draw your fill patterns on the extra display page. You may find it convenient to work with your right hand on the mouse and your left hand on the j key, which is the shortcut for the Swap command.

Setting the Grid Size

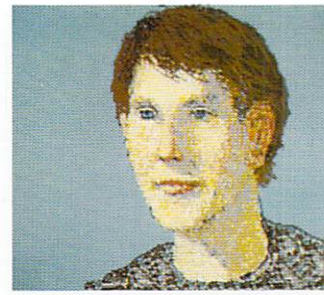
Once you've got your pattern the way you want it, you must cover an area of the screen with it larger than the shape you want to fill. To duplicate the pattern properly, you first have to set the grid size to match your pattern (if your pattern matches the default grid size, you can skip this step). Click on the grid tool with the *right* mouse button. You should get something that looks like a small checkerboard, or a waffle iron. Move the upper left-hand corner of it directly on top of your fill pattern. Now, click the right mouse button again and stretch the grid until the corner square of the grid is the same size as your fill pattern. The lower-right corner of that grid square should be at the spot where the extra right edge and bottom edge of the pattern meet. You can use the magnifier to make sure you get it lined up correctly. If you do, though, use the zoom box to set a fairly low level of magnification—otherwise Deluxe Paint will get pretty sluggish.

Copying the Pattern

Now you can make some copies of your pattern. Take the brush-selection tool and grab a copy of the pattern. Drag it around and cover a good-sized area with it. You can see how your pattern looks when it's repeated. If you don't like it, you can make some changes to it and try again. Make a copy to draw on top of, so that the new version will be aligned properly with the grid.

Preparing the Shape

Now you have to prepare your shape. To keep the pattern from showing through where you don't want it to, you may have to "mask out" the area around it. Select a color that you haven't used in your picture yet, and pick the fill-with-color tool. Fill around the outside of your shape, and any parts inside it where you don't want the pattern to show. If there are any solid areas of color that you want to replace with the pattern, fill them in with the background color. Normally, the back-



ground is black, but it can be changed. Make sure you use the *first* color in the palette.

Filling the Shape

Make sure the Grid option is still on for these next few steps. Use the brush-selection tool to grab the shape (or shapes) you want filled in. Now switch back to the screen with your fill pattern on it. Move your shape to cover it up. The pattern should show through wherever your shape contains the background color. Click the left mouse button to make an imprint of your shape on top of the pattern. Now use the brush-selection tool to pick up the colored-in shape. Switch back to your picture and paste it back in. The last step is to use the fill-with-color tool to change the areas you masked out back to the background color. That's all there is to it!

For Limited Memory...

If you only have 256K, you can draw your patterns in an empty corner of your picture and erase them when you're finished. If you plan to fill in a large area, though, you may have to cut off smaller pieces of it and fill them one at a time. But this doesn't work too well if your picture doesn't have a large empty section to work in. One way to get around this is to draw your shape on a blank screen, fill it in with the pattern you want and then use the brush-selection tool to copy it into the picture in which it belongs. This is also handy for pictures that use all 32 colors or have fancy textured backgrounds, thus making it difficult to mask out sections properly. If you know when you start a picture that you intend to use fill patterns, it's advisable to first make a line drawing, fill in areas, and then do any airbrushing last of all.

An Alternative Method

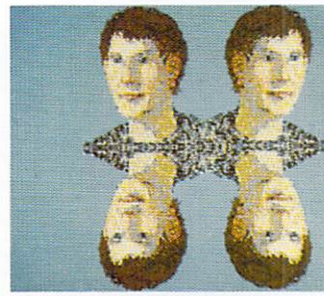
If you have 512K, there's another method of filling your shapes that you may find easier. After you've masked out the necessary areas of your picture, fill the pattern screen completely with your fill pattern. Switch to the picture screen and go to the Spare option on the Picture menu. There should be a submenu. Select the Merge-in-Back option, and any parts of your picture where the background is showing will be filled with the pattern.

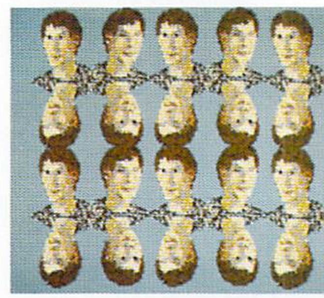
This method offers you some added flexibility. If there's a section of your picture that would be difficult to mask out, you don't have to. Instead of filling the extra screen completely with the pattern, you can cover only the areas you want to fill. Use the brush-selection tool to grab a copy of your pattern. Now switch to your picture and select Copy-to-Spare from the Spare submenu. Cover the areas you wish to fill with the brush, switch to the other copy of your picture and Merge-in-Back again. If you save some of your favorite patterns as brushes, you can use this approach to fill different parts of your picture with different patterns. Once you've got a fair number of patterns, you may also want to save sample screens of them, just like the Patterns picture that comes with Deluxe Paint. That will help you find the ones you need more quickly.

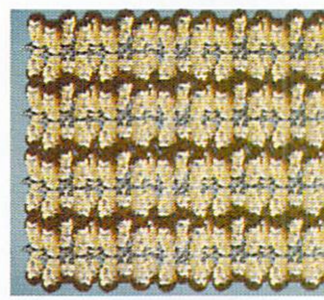
Wanted: A Pattern Editor

There's just one more thing that's needed here. Wouldn't it be nice if you could tell how your pattern will look while you are designing it, without having to grab copies of it and drag it around? Perhaps some enterprising reader out there could write a pattern editor in Basic and send it in. Ideally it would allow the user to specify any height and width and then provide a grid of that size. The grid would contain a magnified view of the pattern, and to the side of it would be a five-by-five block of normal-sized copies of it. The normal-sized view should be updated after every change to the magnified view to provide instant feedback on how it will affect the pattern. A complete set of 32 colors should be available, with provision for choosing which colors from the Amiga palette to use. Last but not least, the program should be able to save your pattern as a brush when you're finished, so that it can be read directly into Deluxe Paint.

Even without a pattern editor, though, there's plenty you can do with this technique. Good luck, and happy painting! ■









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IFF: A New Standard

By Matthew Leeds

Software developers are discovering the benefits of Electronic Arts' Interleaved File Format, a new standard for data file storage.

Communicating information between computers has always been a difficult task. Not only do programs run under many different languages, computers use many different operating systems as well. The concept of a universal language for computers seems far fetched, and far away.

When Electronic Arts began to develop software for the Amiga, they recognized this problem. Most of the early development for the Amiga was done on other machines and ported over to the Amiga for testing and debugging. Standards needed to be created for this purpose.

Then a larger vision began to emerge. On other machines, programs create files that cannot be read by other programs. A paint program stores its bit map in one location and its color information in another. When a different paint program tries to read the first file, it expects data to be stored differently on the disk. In fact, it may not even recognize the existence of the other program's files. This kind of problem becomes much worse in a multitasking environment. The need for a data file storage standard became apparent.

There are many advantages to having a standard. End users can move information created by one application into another, importing spreadsheet data into a word processor, or picture parts into an animation program. A standard creates an incentive for the creation of libraries of data: clip art, sound effects, fonts, etc. Particularly on the Amiga, such a standard makes good sense. A multitasking computer needs to be able to read data created by any program running, and it needs a way to pass data from one program to another when those programs are not running concurrently.

In theory, it would be advantageous to implement this standard across many different environments. Imagine a CD-ROM containing many different data files, readable by any computer since they all understand the file standard. The cost of production falls dramatically.

The Interleaved File Format

The standard that has been developed by Electronic Arts is known as Interleaved File Format (IFF). This is a fully extensible, open-ended, evolving data file structure that is rapidly being adopted by many of the developers working on the Amiga. Electronic Arts has made available information, documentation, source code and technical support to other companies who adopt IFF. It is rare to see R & D of this complexity being shared freely. In fact, the full documentation, including source code, is being published in the current revision of Commodore's ROM Kernel manual for the Amiga.

The person responsible for most of this work is Jerry Morrison. His background includes work at the MIT AI lab on the Dynamot project (start of Infocom) where he worked on time-sharing personal computer concepts. From there, he went on to work for Xerox on the Star project. He was intrigued by the notion of a graphically-oriented user interface. When he arrived at Electronic Arts, he worked on the Cut and Paste word processor and the Financial Cookbook for the Mac.

Says Morrison, "I personally am interested in all kinds of products that make computers useful. That means they must do useful things, fun things, and as much as possible, they should have a good user interface so that the computer extends further and further towards the person, rather than the other way around. It's not easy, we're learning all the time how to do that, but it's absolutely clear that that's what has to happen. There's no reason for people to have to grope with MS-DOS directories when all they want to do is print their files. Our culture has not had computers around long enough for people to understand how to use them on an intuitive level. A large body of knowledge has not formed yet. Think of automobiles, remember growing ►



Illustration by John Hersey

up with them, watching adults operate them, watching TV shows with cars in them, seeing cars all around you...as we grew up, we learned about cars from the society around us. That's just starting to happen with computers."

How IFF Works

IFF is designed for computers that process information in eight-bit bytes. The standard treats a file as a container of data bytes and is independent of the process of finding a file. All data larger than a single byte is padded to align on even byte addresses relative to the start of the file. If padding is needed, it is done with zeros. This allows data to be stored in "chunks." Even alignment may mean a little more work in creating a file, but it allows the 68000 to construct and scan data in memory and do block I/O. Characters are stored as eight-bit ASCII.

In developing IFF standards for musical data, Electronic Arts was in the peculiar position of having to create the file structure that would be used by its competitors.

Any IFF file will have an ID to identify its type. The ID is a 32-bit value that is the concatenation of four ASCII characters. Examples include TEXT for word processor files, ILBM for paint program files and SMUS for a musical score.

The building block of an IFF file is the chunk. Chunks start with a header that contains the ID (ckID) and the length of the chunk (ckSize). If the chunk has an odd number of bytes, a zero byte, which is not included in the ckSize, is added to it. This requires any program that reads IFF files to respect the size indicated by the ckSize. A program would see the header of an IFF file like this: "IFF file type ckID, ckSize bytes long."

The Nitty Gritty

So much for the simple part; now we can get into the meat of the issue. The first thing you will find in an IFF file is one of three IDs: FORM, LIST or CAT. The simplest is FORM, one solid chunk of data with nothing following it, an ASCII file, bit map, one instrument, etc. There may be nested FORMs inside of a FORM, but they are all part of the same entity/contiguous/conceptual data chunk. FORM is a wrapper for the components/directory. Think of it as a C structure of a Pascal record or a SNOBAL table, or like a Mac resource file but more general. FORM is the grounding concept, the main idea behind IFF; then, you can go up or down from there, either finer or coarser in detail. In a sense, it's like the Japanese dolls nested inside of each other. The largest doll contains all the smaller dolls, but each doll is still a doll unto itself, and can be recognized as such without seeing any of the other dolls. It is possible to extract usable data from a FORM.

Next is CAT. A CAT is a scrape file—a collection of not necessarily related entities, a concatenation of things. There may be no logical imperative to collect the items in the file, but a CAT describes the collection.

LIST is a group of items that belong together. They usually share some characteristics: the same bit map, colors, shapes, size, etc. The characteristics that they share are described in a PROP, so that a LIST is a list of all items in a LIST, and a PROP is a property shared by all items in the LIST. It is possible to have multiple PROPs in a LIST. Nested LISTs are also possible, which eliminates the probelm of not all of the items in a LIST sharing all PROPs. Think of it as a structured programming language for data files.

There are many different types of FORMs. An FTXT is a text file with character formatting information, such as font size and typeface. It contains no document formatting information like paragraphs or margins. Font sizes are encoded in decipoints (720 decipoints per inch), compatible with existing typographic units. New FORM types can be added at a later date to add document formatting data.

Another FORM is the ILBM, or Interleaved Bitmap. This is the format for a two-dimensional raster graphics image with a color map. There is, or can be, a lot of information in an ILBM. It contains a bitmap header (BMHD), source raster bitplane (BODY), color map (CMAP), hotspot (GRAB), sprite information (SPRT) and viewport mode data (CAMG). There may be other data types as well.

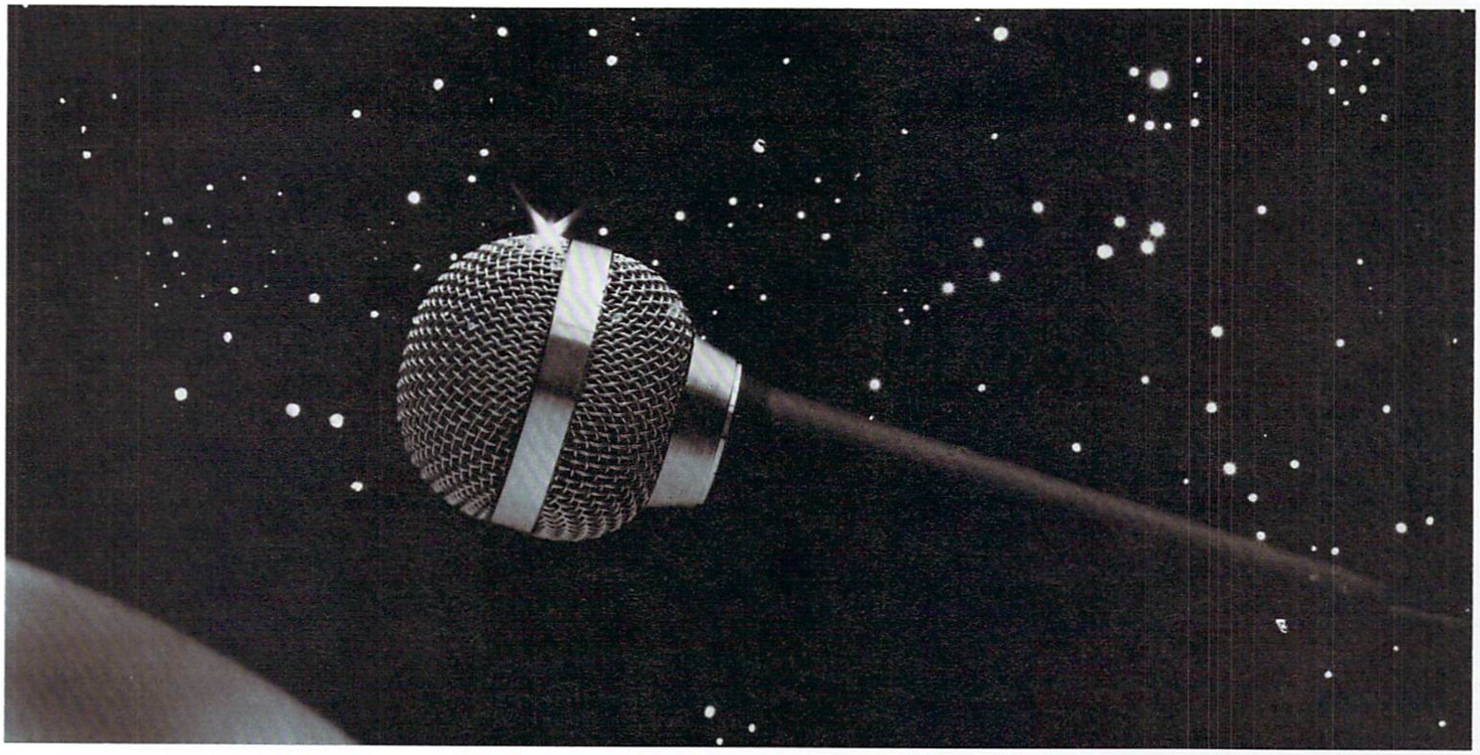
An ILBM contains some important characteristics. The aspect ratio, X,Y coordinates, resolution mode, palette, size and color range are just some of the possible information found in this file type. A BODY chunk is a concatenation of scan lines from each bit plane. The first scan line from each bit plane is stored in the file, then the second scan line from each bit plane is stored, and so on. This allows you to work on one scan line at a time to modify images, instead of needing sufficient memory to buffer the entire image before doing any modifying. There are many other ILBM types, including some that are specific to a particular program; however, the IFF standard allows a programmer to throw away the unneeded parts of a file.

The development of IFF standards for musical data was critical for many companies. Electronic Arts found itself in the peculiar position of having to create the file structure that would be used by many of its competitors in time for them to be able to use it in their own products. The result was just being published at press time. It included two new FORMs for music files, SMUS for musical scores and 8SVX for one-shot sounds (sound effects).

A score can be a classical type of musical notation, with quarter notes, half notes, a staff, etc. Or, it can be a MIDI type of score, with time, velocity, pitch bends, etc. It would be nice to represent both types with a single file type and have programs be able to read the parts they need. However, the MIDI data is much more loose, and you need to know much more about how the application will be using the data.

In discussing the problem with many organizations, Electronic Arts came to the conclusion that they needed to start by solving a simpler problem. What programmers needed was a fairly simple type of musical score that would allow for the transfer of basic musical information between applications. The SMUS IFF is a classical type of musical score in the sense that the computer will be able to play the file and applications will be able to display a score as standard musical ►

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◀ notation, but there is specific data not carried in the file. Things like whether the stem of the note is up or down will have to be default values carried in the application. The format is extensible, but probably a more comprehensive format that will support other data will be created, while retaining compatibility with the current format. Another possibility is that there will be more than one type of file, and programs will be able to recognize which type they want to use by the IFF header, and either select the ones they want or know how to handle the ones available to them.

One-shot sound is a simpler matter. There is not as much variability. You basically have the sampled sound, perhaps a way to compress it, the data rate at which it was sampled and the volume. This file structure is for an eight-bit sample, since that is what most micros are currently using, as opposed to the professional music world, where 12- and 16-bit samples are being used. Taking an eight-bit sample, along with a volume bit, a fairly good signal-to-noise ratio can be obtained. With careful control of the recording environment, it can approach 40db. By recording it at the maximum level at which you might want to play it back, and then playing it back at a lower level, you get an effect similar to DBX, a compression effect that gives you a better sound.

It is not a simple task to use IFF files. However, Electronic Arts has made some programming data available.

Another reason for deciding to go with the eight-bit file type is that converting a larger bit file to work on an eight-bit system is very difficult. You cannot just throw away the extra four bits, or you'll lose any idea of what the original sound was like. To reduce the number of bits in a file is very difficult, and it made more sense to have several file types with headers that would declare what their sound resolution was up front, and how many bits deep they were. If a program is capable of handling more than one level of bit resolution, it will just read all file types, and if it cannot, then there will be no point in converting a file anyway.

Another consideration is that since micros don't have the hardware for the larger sample size, by waiting until that hardware is available, you may gain some insight into other needs and requirements that must be built into a file type. An interesting note is that built into the description of an 8SVX is an optional property, (c), for holding a copyright notice to that "sound." Imagine a CD-ROM with 500 MB of sound effects on a single laser disk in digital format.

There are no IFF standards yet for musical instrument description files. This type of file is very device specific and device-driver specific. A specific computer will have a very different need for data to describe how an instrument works, which sound waves represent that instrument, what the envelope for that instrument is, and so on. And if you're using a MIDI port, you need information on how to talk to a device on that MIDI port, and how to tell it to change presets, etc. If you move the instrument file to a different machine with different sound driver hardware/software, it's probable that the instrument description may not be any good. This is the most difficult area in which to devise a standard. The MIDI manufacturers have been working on a similar aspect of this problem for several years and still have not resolved it. The early draft standards are just now being done for the IFF format, and Electronic Arts is just now beginning to create working code in this area. A lot of work still needs to be done. There does not need to be only one IFF musical instrument format. As long as developers adhere to the general idea of the way IFF handles things, it leaves open the possibility of programs being able to understand other program's files, and that file formats will not become outdated.

Anyone can create a new FORM type ID, but they should reserve it with Commodore and Electronic Arts at their earliest convenience. The main concept to keep in mind when creating a new FORM is that it meets the needs of many programs without getting too complicated. Reading an IFF file is a parsing task. An IFF file reader does not assume information will be in a particular order, just a particular format.

Costs and Risks

There are costs in using IFF. Storage on disk may increase, but that is a minimal cost. The programming cost is much higher. It is not a simple task to use IFF files. However, Electronic Arts has made some programming data available. The AmigaLink on-line service will have IFF source code available for download. Also, programs tend to get larger and require more memory. There is also the risk that a program that tries to adhere to IFF may not do so, and might garbage files created by another program. Always back up important files when trying out a new program. Many software publishers have decided to adopt the IFF standard in their products. I suggest you look at the advertising on Amiga software for information on whether a particular program supports IFF.

"I never expected this to become so big a job, or to take up so much of my time," says Morrison. "But it's a big issue. Part of it is careful data representation and finding out what people need in a data representation. Part of it is that standardization in general is a problem. You have to design something that people can use, or get them to collectively design it. You have to get them to agree on something. Coming to a consensus is a good process, but it can take a very long time. So what is needed is a balance of all these things. Then you need to communicate it all very clearly. The documentation, and the rewriting of documentation every time I discover someone misunderstood a part of it, and producing new versions of documents as I try to clarify information, takes up enormous amounts of time. But what we're doing is worth the effort. We're making this new medium possible. We're making it come to pass."■

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Computer Graphics: New Tools and Techniques for Artists

By John Warren Oakes

Using an Amiga, a video camera and a digitizer, artists can transfer their artwork to the computer screen for obtaining color transparencies and prints.

The Amiga is bridging the gap between traditional art media and the technology of computer graphics. Contemporary artists are beginning to use video cameras to transfer their designs, drawings, paintings, photographs and prints through a digitizer to the computer monitor.

In the creation and development stages, the Amiga is a powerful tool. Artists can make changes rapidly and easily. The ability to save work at any stage of its development allows temporary changes to be made and printed from the same design. This amounts to a new level of freedom for artists in the area of creative exploration.

Computer graphics do not have to mimic traditional art media, but created images can be reproduced in traditional art materials to provide a permanent print on 100% rag (acid-free for permanence) paper.

Screen Shots

A positive color film transparency can be made by copying the image from the monitor screen. This procedure involves placing a camera on a tripod so that the center of the lens is lined up with the center of the screen. A fast film should be used, like Tri-X, and a daylight film should be used if copying in color.

The image, formed on the screen, is made by a moving electron beam that scans the picture in two sections. It takes about one thirtieth of a second to complete an image on the screen, so camera shutter speeds





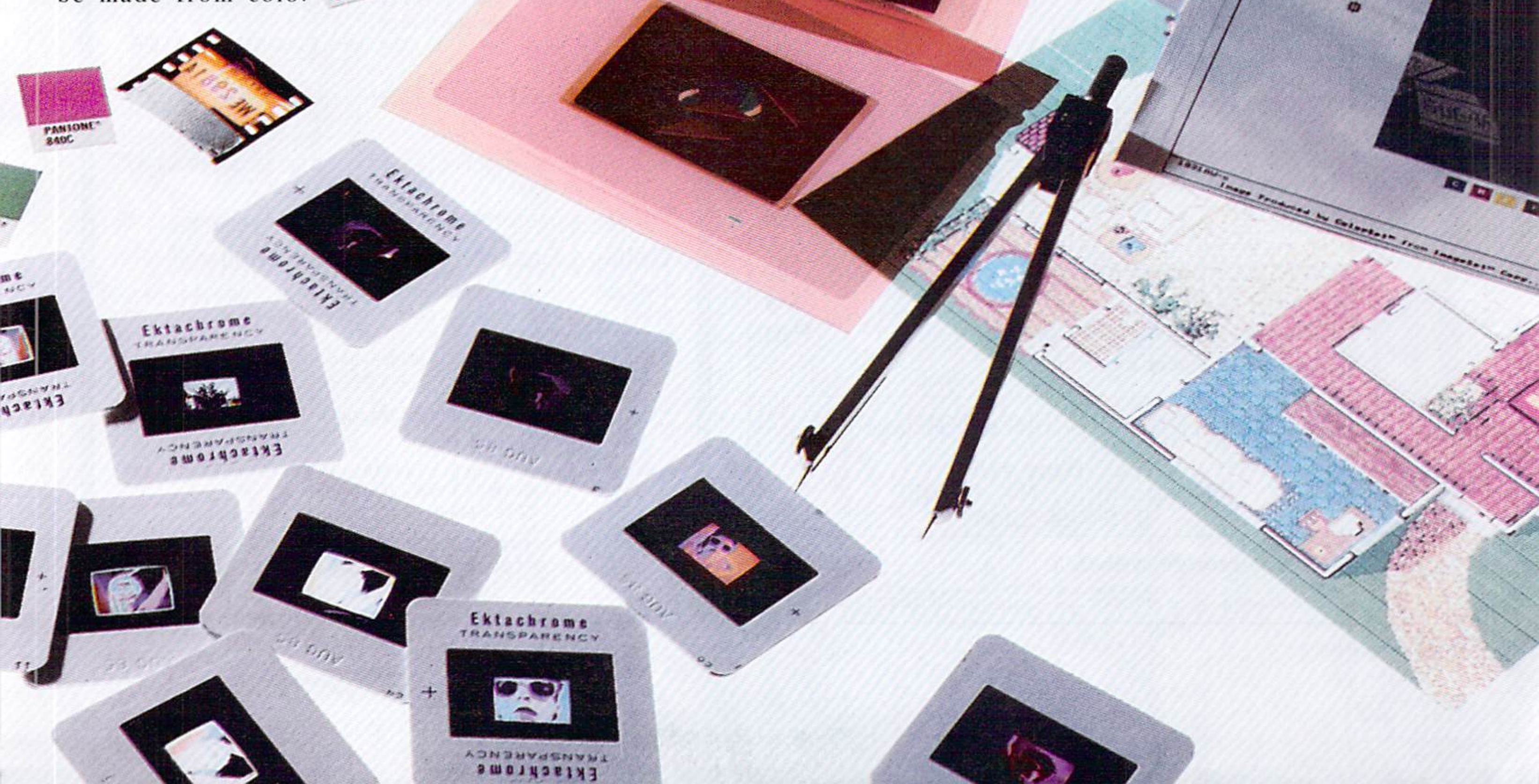
faster than one thirtieth will often cause a dark band across the picture copy. One should use shutter speeds of one eighth or one fifteenth of a second. A single lens reflex camera is a good choice. Most cameras will focus close enough to fill the frame of the camera with the screen image. If it does not, then a close-up lens must be attached to the lens.

Reflections can pose a problem on the surface of the screen. All room lights must be turned off and windows covered. Adjustable, pyramidal boxes are available, which hood the screen, joining the screen and lens, excluding reflections. To determine the correct exposure, an automatic camera or a reflected light exposure meter are used to take a light reading from the screen.

A series of exposures should be taken, with one at the suggested f-stop; additional exposures should be made by opening up and closing down the lens diaphragm in one-half stop sequences. One of these exposures should record a good image of the picture on the screen. Color negative film may be used if the final product is to be a color photograph. Cibachrome color prints use very permanent dyes and can be made from color slides. Black-and-white film like Tri-X is exposed in the same fashion. If a positive black-and-white slide is required, one should use Polaroid's Polapan film.

Print Processes

Enlarged prints of the 35mm slides can be made on a Xerox 6500 Color Copier combined with a slide projector attachment and a plastic dot screen placed on top of the platen. This machine makes a clean, hard-edged copy, capturing detail as small as the characters on a typewritten page. Many copy centers have these copiers and some provide mail-order service. ►



The 6500 has both color and contrast controls, which allow further fine tuning of a print. This copier uses standard 20-pound bond paper; 100% rag art paper like Rives BFK or Arches may be inserted in the machine by a trained operator. Xerox also makes a special transfer paper that allows a slide to be enlarged and transferred to any paper or natural fiber cloth. A simple hand iron, set on the heat setting for linen, can be used to transfer the color toners in the latex-coated transfer paper onto the new base material. Thus, large pictures can be made by combining or overlapping the images from several sheets. The transfer paper should be peeled from the base in a smooth, continuous pull, or a line will occur on the print. Colored pencils, pastels, watercolor or acrylic paint may be added to alter the print at this stage.

Print processes requiring color separation negatives are possible if the color separation negatives are made from a 35mm slide projected in an enlarger onto Kodak's Super-XX film. Three negatives are made, one each through Wratten Red #29, Green #61 and Blue #47B gelatin filters, which are placed between the slide and the Super-XX sheet film. These separation negatives can be used in the gum bichromate and Kwik-Print color processes, which use transparent light-sensitive emulsions and contact negatives to produce full color prints on art papers.

If Kodak's Autoscreen film is substituted for the Super-XX, one can make photo-silkscreen prints, photo-etchings and photolithographs. The halftone screen is built into the emulsion of this film. Black-and-white negatives, taken from the monitor screen, can be used to print different colors in the gum bichromate and Kwik-Print processes. These negatives may also be of service when making traditional silver prints, as well as the non-silver processes like platinum, palladium, kallitype, blue cyanotype and Van Dyke brown prints. All of these prints may also be hand colored.

Kodak's High Speed Duplicating Film #2575 is suitable for enlarging 35mm negatives to a larger-sized negative for techniques requiring a contact negative of the same size as the print.

With these techniques, computer graphics are being combined with the traditional media of the artist to create the fine art of the future.■

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Reviews

OnLine! and the Courier 2400

Telecommunications in the fast lane.

Telecommunications with a computer is a pretty complicated undertaking. You have to connect three disparate pieces of equipment—a computer, a modem and a phone line—and then get them to work in harmony. Often times, it requires the patience of Job to get your communications system up and running. With OnLine! and a Courier 2400, however, you have the makings of an easy-to-use telecommunications system for your Amiga.

Software and Hardware

OnLine! is a telecommunications software package from Micro-Systems Software, Inc. OnLine! controls communications between your computer and your modem. It dials your modem, reports on the condition of



the connection and supervises the flow of data to and from your computer. Communications software is often the weakest link in the telecommunications chain. A good package can make your life easier, while a poor one can drive you to distraction. With a few qualifications, OnLine! is a very good package.

The hardware side of the telecommunications equation centers on the modem. Ideally, your modem should be "invisible"—it should work so well with your computer and software that you're hardly aware of its presence. In conjunction with OnLine! and your Amiga, the Courier 2400 from U.S. Robotics fits this description admirably.

Installation

Getting OnLine! up and running is as easy as clicking on the OnLine! icon. The program doesn't require any installation. Hooking up the Courier 2400 is a bit more involved. You have to purchase a serial cable to connect the modem to the serial port of your Amiga. The important point to remember is that the Amiga sends power over three of the lines of its serial port. You want to buy a cable that *doesn't* use these lines. The Courier 2400 comes with an external power supply; it doesn't expect to get power from the serial connection. Your dealer can supply you with an RS-232 cable for the Courier.

Once your modem is hooked up and you get OnLine! running, you're ready to make your first call. OnLine! squeezes eight menus into the menu bar at the top of the screen, and the display is confusing the first time you run the program. The documentation isn't much help at this point. You don't learn how to actually make a call until page 27 of the Getting Started section. I think it would have been much better if the documentation started off with how to make a connection and then went into how to save a terminal file or how to change the window.

Eventually, you learn to place a call. You input the number via the Phone menu, set the communications parameters under the COM menu, and then select Call from the Service menu. It's easy, once you figure it out.

The problem in making your first call illuminates my main gripe with OnLine!. I don't like the organization of the menus. To me, it seems more straightforward to enter the phone number and any prefix under the Call item in the Service menu, instead of using a separate menu. In general, I found the menu names and the subordinate items to be ambiguous. I couldn't tell by simply looking at the menus what each item did. At this level, OnLine! does not represent the ultimate in user friendliness.

Once you get into OnLine! however, you discover a lot that makes your life easier. Once you've set the communications parameters and phone number of a communications service or a bulletin board, you can save ("Archive" in OnLine! parlance) and recall them with ease. Not only that, but OnLine! gives you two methods for creating macro files containing the log-on procedures for any information service. With one method, OnLine! "remembers" the log-on procedure and saves it with the file containing the phone number and communications settings of the service. The second method allows you to write your own "script" of a telecommunications session. OnLine! contains a specialized language that you can use to automate any telecommunications session. Writing a script file is more involved than having OnLine! memorize a log-on procedure, but it gives you tremendous power and flexibility.

OnLine! is powerful in other ways. For each service you enter, you can define macros for the ten Amiga function keys. You can create translation tables that can transform the ASCII value of a character to any other value. This is a specialized feature that you may never use, but I found it essential in interfacing with our typesetting department.

Protocol

OnLine! supports Xmodem, CRC-Xmodem and Hayes Verification Protocol. You can send and recieve text or binary files with any one of these protocols. In addition, OnLine! lets you send and receive text files without error checking. Non-protocol transfers are a little cumbersome, since you

have to load a text file into memory before sending it, but you do get to specify character and line delays, and you have the option of viewing a file before transmitting.

In terminal mode, OnLine! turns your Amiga into a TTY terminal. You have the option, however, of overriding this default and having your Amiga emulate a DEC VT-52 or VT-100 or an ANSI standard terminal. OnLine! also lets you use your printer to get a hard copy of your on-line sessions. OnLine! also lets you define the size of your window. I found that a borderless, 23 x 80 display worked best when I accessed information services and our E-mail system.

Controlling the Modem

The Courier 2400 turned out to be an excellent companion to OnLine!. The Courier modem uses the AT command set, devised by Hayes and now a defacto industry standard. OnLine! is designed to work with the Hayes command set; you can use other command sets, but the Hayes set is built-in. The Courier 2400 performed flawlessly with OnLine!. I had some trouble with garbled transmission when in high speed mode, but I attribute this to the antedeluvian phone system we have in Peterborough, NH.

The Courier supports 300-, 1200- and 2400-baud transmissions. It is an auto-dial, auto-answer modem. It has a number of features not found on a Hayes modem, including help screens and adaptive dialing (it automatically chooses pulse- or tone-dialing), but its biggest advantage over the Hayes Smartmodem 2400 is that it, unlike the Hayes modem, supports the Hayes AT command set! Isn't life strange?

Conclusion

OnLine! is a high-powered communications program for your Amiga that can deal with almost any telecommunications situation. It is not the easiest package to learn and use, and novices should probably avoid it, but to the professional or hard-core user, the effort is worth it. I just wish that Micro-Systems Software had included an auto-answer mode so that I could take full advantage of the capabilities of my modem.

The Courier 2400 is an excellent high-speed modem. If you're serious about telecommunications, then it is a good choice. If you don't intend to use the modem professionally, then you should probably save yourself some money and buy a 1200-baud modem.

Individually, OnLine! and the Courier 2400 can go a long way towards ending your telecommunications woes. In tandem, they offer a complete telecommunications solution to serious users.■

—AmigaWorld

OnLine!
Micro-Systems Software Inc.
4301-18 Oak Circle
Boca Raton, FL 33431
305/391-5077
$69.95

Courier 2400 Modem
U.S. Robotics Inc.
8100 N. McCormick Blvd.
Skokie, IL 60076
312/982-5151
$699.00

The Okimate 20

You get what you pay for.

Printer technology has not kept up with computer technology. While it is easy to create intricate color graphics on the Amiga, it is not so easy to get a hard copy of those graphics. The Okimate 20 from Okidata is an inexpensive though not wholly satisfying solution to the problem of getting your Amiga graphics onto paper.

Setting Up

The Okimate 20 comes in two pieces: the printer and a Plug 'N' Print module. You need both in order to run the printer. The printer is generic to all computers; the Plug 'N' Print module is specific to the Amiga.

Installing the Okimate 20 is easy. It comes with everything you need, including ribbons, paper, and, most importantly, its own printer cable. The printer hooks up to the parallel port of your Amiga. To use the printer, you merely plug the Amiga Plug 'N' Print module into the printer and connect the printer cable to the port on the Plug 'N' Print module.

The Okimate 20 is compact and light. It will easily fit on your desk. One drawback is



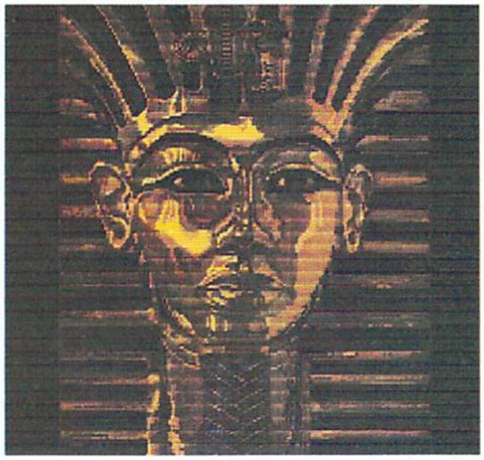
that, as a small printer, the Okimate 20 has a small motor moving the print head back and forth across the paper. The Okimate 20 won't stand up very well to a continuous pounding, so don't try doing your company's mailing list on it.

Text Output

In text mode, the Okimate produces good quality output at a reasonable speed. It has two print modes: draft and correspondence. Rated 80 characters-per-second in draft mode, the actual throughput is a little less. The quality of the draft mode is fine for program listings and rough drafts. The correspondence mode produces good quality output at nearly 40 cps. The correspon- ►

dence mode can't replace a true letter-quality printer, but if you need speed and print quality at a reasonable price, the Okimate can do the trick.

The Okimate can print superscripts, subscripts, boldface and italics. It complements Textcraft very well. When used with the thermal-transfer paper that comes with the printer, the output from Textcraft looks like it was produced by a much more expensive printer.



The thermal-transfer technology used by the Okimate 20 is both a blessing and a curse. On the plus side, thermal transfer allows the Okimate to offer high-quality output at a reasonable price. On the down side, to get the best results, you have to use high-priced paper. The thermal-transfer technology also uses up printer ribbons at an alarming rate.

What You See...

Since the Okimate 20 is supported directly by the Amiga, it doesn't come with a graphics-dump program as do the IBM and Apple versions of the machine. By selecting the Okimate 20 driver from the Preferences screen, you're assured that you'll be able to print out what you see on the screen. Almost.

When I first tried to print with the Okimate 20 from Deluxe Paint, I ran into my first snag. The problem was not with the printer, however, it was with the software. I could find no way to select the Okimate 20 or any other printer from Deluxe Paint. Finally, I resorted to leaving Deluxe Paint, booting Workbench in the internal drive, selecting the Okimate 20 from Preferences, and then changing the default drive to DF1: and starting Deluxe Paint from my external drive. There might be an easier way to do this, but I haven't found it yet.

When I finally got everything set up, I loaded the KingTut picture into Deluxe Paint and selected Print. Nothing happened at first, and I despaired that my fix hadn't worked. Finally, however, the Okimate 20 came to life and began reproducing King-Tut on paper.

Graphics printing is a slow process on an Okimate 20. Each line of graphics requires three passes of the print head—one for each of the three ribbon colors—and each picture is 36 lines. Depending upon the complexity of the picture and on the heat buildup in the print head, a picture can take ten or more minutes to print. KingTut took 16 minutes.

The quality of graphics on the Okimate 20 is fair. The major problem is that each of the lines of the printout overlaps with the line below. When printing a solid color, the overlap results in thin, dark lines running across the page. This defect limits the Okimate's usefulness in a professional environment.

The only other gripe I have with the Okimate 20 is that the colors it produces don't always match the colors on the Amiga screen. This is not a great problem; at least the colors are reasonably close.

Conclusion

If you want to be able to print color graphics from your Amiga, and you don't want to spend a lot of money, then get the Okimate 20. You can't do better for the price. On the other hand, if money is not a consideration, or if you need higher-quality output, then you may want to check out some of the higher-priced color printers on the market.

The Okimate 20 retails for $149 and the Amiga Plug 'N' Print module sells for $99. Black ribbons cost $4.95 and produce 50–75 pages of text. Color ribbons cost $5.49 and produce about 17 pictures.■

—AmigaWorld

The Okimate 20
Okidata
532 Fellowship Road
Mt. Laurel, NJ 08054
609/235-2600

One-on-One

Larry Bird and Dr. J are better than ever on the Amiga.

From the squeak of Dr. J's sneakers as he steps towards the basket to the arch of a Larry Bird jumper, One-on-One from Electronic Arts captures the essence of a duel between two of the best players in basket-

ball. Booting the program on your Amiga is like stepping into the Boston Garden. With One-on-One, though, you're not simply a spectator; rather, you get to take part in the action.

Getting Started

You start One-on-One by inserting the game disk when your Amiga prompts you for a Workbench disk. After the game loads, you get an action demo with a menu bar across the top of the screen. The menu items are Players, Options, Skill, EndGame and Game. You access the menus with a mouse or a joystick.

The Players menu lets you indicate the number of human players. You can play against the computer or against a friend. If you're playing against the computer, you indicate whether the computer will take the part of Larry Bird or Julius Erving. The Options menu lets you choose winner's or loser's out, while the Skill menu lets you indicate how well you want the computer-controlled player to perform. Four skill levels are possible. With some experience, you should have no trouble beating the computer at the Park-and-Rec level. It will take a lot of practice, however, to beat the computer at the Pro level. With the EndGame menu, you can choose to play a game with two-, four-, six- or eight-minute quarters, or to have the game end when a player reaches a certain number of points, such as 21. Once you've set the game parameters, you pull down the Game menu, select New and get ready for action.

Start the Clock

The game begins with one player getting the ball near the three-point line and the player on defense positioned near the top of the key. On offense, you use the joystick or mouse to move your player and the button to spin your player 180 degrees or jump and shoot. A quick button press causes a spin; holding the button down causes your player to jump. When you release the button, your player releases his shot.

On defense, a button press results in a steal attempt, an attempted block, or a rebound attempt, depending on what the offensive player is doing. Although the game controls are easy to master, they give you a great number of options when used in combination. One-on-One is a game that you can learn to play in two minutes.

The players do not have identical abilities. When you take Larry Bird, you'll find that you hit a greater percentage of outside shots than Dr. J. The Doctor, however, is quicker than Larry and can jump faster and higher. Both players have a bar that measures their level of fatigue: You can't do much with a tired player.

When you get the ball, you have 24 seconds to get off a shot. If you don't, you turn the ball over. You can also turn the ball over by running into a stationary defender (charging), failing to clear the ball past the foul line on a change of possession, or by failing to release a shot after you jump (travelling). Defensive fouls include reaching-in, blocking and hacking. All fouls are called by a not-too-dependable referee. You're allowed five personal fouls per game before you enter the penalty situation.

Graphics and Sound

The best computer games use graphics and sound to create an atmosphere that allows you to suspend your disbelief and become absorbed in the action. One-on-One features rich color graphics and the best sound I've ever heard on a computer game. The roar of the crowd, the PA announcer and the ball noises all contribute to making One-on-One an exciting sensory experience.

I am disappointed with a few things about the game. For one thing, the 24-second clock and the game clock are not synchronized; the 24-second clock runs faster. You have to keep this in mind if you want to run out the clock. Also, I don't like the fact that the shot clock recycles after a timeout. This could give a player as much as 47 seconds to get off a shot. Aside from these minor matters, One-on-One for the Amiga is a beautiful simulation. It is the best action game I've ever played on any computer. If you like action, or if you'd just like to know what it feels like to shatter a backboard with a thunderous slam, you owe it to yourself to buy One-on-One.■

—*AmigaWorld*

One-on-One
Electronic Arts
2755 Campus Drive
San Mateo, CA 94403
415/572-ARTS
$39.95

The Seven Cities of Gold

A graphics adventure where you are the conquistador who discovers a new world.

The sun is rising on a day full of promise for the future. It is March 1492. You promise the king that you will find a new world and return with gold and glory for the crown. You begin just west of the Canary Islands, 30 degrees North latitude. Your ex- ►

pedition includes four ships, one hundred men, 52 weeks of food and 300 items to trade with any of the natives you may encounter in the New World. Ahead lies the unknown. This is your hour, your chance to find fame and fortune. History awaits your making; its shape is in your grasp.

So begins the search for the seven cities of gold. You are the captain of an expedition leaving from Spain in search of a new world. Along the way you will encounter the same difficulties that Columbus, Pizarro or Cortez had to overcome. Your food spoils, storms blow you off course, your men die; all this before you even reach the New World.

Once you have reached land, you send out expeditions on foot to discover mouths and sources of rivers, mountains, plains, swamps and natives who range all the way from small hunting tribes to sophisticated agricultural city states. If you manage to survive your encounters (either by peaceful trading or armed conquest) and return to Spain with maps, discoveries and, most importantly, gold, the king just may look kindly on your next journey.

Seven Cities offers much more than the traditional computer game. It is absorbing and educational (though no mention is made in the manual of its educational value). The game can be played repeatedly without producing the same results. The three skill levels range from moderately difficult to damn near impossible. At the "novice" level, villages and cities are displayed when you pass near them, while at the high level you must land and search for signs of natives, or, as often happens, stumble upon them.

The world you explore can be a fairly accurate recreation of the Americas in the fifteenth and sixteenth centuries, or if you tire of North, Central and South America, you can have the program "create" a unique new world for you. The routines do not simply involve random placements of mountains, villages, etc.; included are tectonic and cultural models that make a newly created world very believable.

While the graphics are not remarkable, there are over 2,800 screens. The game requires a joystick, but quick reflexes are not important; the skills required are mental ones, not manual. Games in progress can be saved to disk—you must have a blank disk for use even if you don't intend to save games. Though speakers are not a must, having them will greatly enhance the game; you will be more aware when the natives are restless, and hear the slapping of the ocean waves.

If there is a major drawback to Seven Cities, it would have to be its addictive quality. The manual doesn't tell you everything—but it doesn't have to. After 20 or 30 hours of "exploring," the only improvements to the game we could ask for would be more options at the harder levels. Navigation, diplomacy, colonization. . . a bank in Spain? Overall, The Seven Cities of Gold is an excellent game that deserves the highest recommendation.■

—AmigaWorld

The Seven Cities of Gold
Electronic Arts
2755 Campus Drive
San Mateo, CA 94003
415/571-7171
$39.95

Borrowed Time

Somebody's trying to get away with murder, and you're the intended victim.

It's a sultry, dog day afternoon in 1934. You're Sam Harlow, private eye, resting comfortably and day dreaming in your office, your feet propped up on your desk. . . .

The phone rings. "Sam, they want you dead. . . ." You see a shadow pass outside your office window. You've just had all the rest you're going to get for a long time. In your quest to find out who's trying to kill you, you can count on being shot at, pushed off ledges, tied up and beaten by thugs. . . for starters.

Activision's Borrowed Time is an illustrated text adventure with the action, plot and characters of a classic detective story. If you've ever wanted to be a private eye, here's your chance.

Playing the game involves typing in commands from the keyboard and selecting on-screen options with the mouse. If you wish, you can play the game exclusively from the keyboard. The screen display includes a menu bar at the top (for loading and saving games), the graphics (your window on the world), a list of nouns and verbs, a compass, an inventory display, text and command line. One of Borrowed Time's best features is the flexibility it gives you in interacting with the computer. For example, loading and saving games can be done by making a menu selection with the mouse, entering commands from the keyboard or using the function keys. For those who like to minimize keyboard entry, the mouse can be

used to select command words from the on-screen list of 13 verbs and ten nouns. Going north, south, east or west is simply a matter of moving your pointer to the appropriate spot on the compass and clicking your mouse button.

You start your career as a private eye by venturing out of your office and exploring your surroundings. You have to determine who is trying to kill you and why, and then bring the evidence to the police.

The manual tells you very little about what's going on. Just about the only person who can give you any info is a blind newspaper vendor named Hawkeye—but you have to find him first.

The plot begins to unravel as you turn the streets of New City upside down, looking for clues. You gather evidence and meet some of the seedy inhabitants of New City, but you have the constant feeling that you are being watched—and you are, by a mysterious thug who threatens your life at every turn.

All the basic rules of text adventuring apply in Borrowed Time. You have to be observant, clever and gutsy. Search your surroundings, examine everything, question anyone who will talk and take anything that might be useful. For those unfamiliar with text adventures, an on-screen tutorial is provided.

You see everything in Borrowed Time from Sam's perspective. The graphics are crisp and colorful on the Amiga, and they are more than just an embellishment—they're also functional. Many clues appear on-screen, and objects can be taken directly from the screen and added to your inventory by pointing to them and clicking the mouse button. If you're a text adventure purist, you can switch back and forth from the graphics to a text-only screen by pressing return only—an interesting feature not mentioned in the manual.

Borrowed Time is sufficiently challenging for even experienced adventurers; you can count on getting killed dozens of times before you even come close to solving the case. The complicated, sordid plot and the situations you find yourself in succeed in making you think like a private eye.

My only complaint is that you get killed too often and too easily. Just opening a door or moving in a certain direction can be fatal at times. This detracts somewhat from the suspense of the game; getting killed becomes a ho-hum affair after it happens to you thirty times. You have a gun, but you won't be very successful in using it, and many times it will just get you into trouble.

Overall, Borrowed Time is challenging, frustrating, absorbing and ultimately satisfying. It should be a hit with most adventurers. Plan to spend many long hours with this one!■

—AmigaWorld

Borrowed Time
Activision, Inc.
PO Box 7287
Mountain View, CA 94039
415/960-0410
$44.95

Mindshadow

An illustrated text adventure where the goal is to find out your own identity.

Mindshadow, from Activision Inc., is an illustrated text adventure that creatively combines a challenging (sometimes downright frustrating) adventure dilemma with high quality, colorful illustrations. The disk for Mindshadow is inserted at the Workbench prompt and self-boots, bringing you to the novel's rather disturbing "cover": a face trapped behind some mysterious barrier. When you enter the story, you find yourself on a remote island. Your main objectives: figuring out how to get off the island, where to go, and, most significantly, who *you* are!

A tutorial for playing illustrated text adventures can be viewed by typing 2 at the title screen if you don't dare to jump right in; the same information, and more, is supplied on a small brochure in the program jacket. Though I generally have trouble sitting patiently through such screen tutorials, the concept of having "everything you need" on the disk is a good one.

Mindshadow can be played on the Amiga completely from the keyboard, or in combination with the mouse; you cannot play it exclusively with the mouse. The screens are broken up into seven sections: the command line section, a place for the objects you have picked up, a direction gadget, a Return gadget, a list of verbs, a list of nouns, and the illustration. The gadgets are handy: by simply selecting your direction ►

◀ with the mouse from the direction gadget, you can avoid having to type the commands at the keyboard. You can also issue and combine commands from the lists of verbs and nouns with the mouse. For example, you can select Strike from the verbs and Man from the nouns with your mouse, if your frustration prompts you to aggression. In this way it can be easier to get something you need (or possibly end your career). The words that are mouse-selectable are not your *only* options; sometimes you must use the keyboard.

Don't be fooled into thinking that everything visible on a given screen is all that's there. Some things are only found by using the right commands. Sometimes objects in a screen can be picked up by clicking the mouse on them (or put down, as the case may be); these things are usually pretty obvious. Other times, however, you have to discover things that are hidden from view. Failing to collect the right items can be disastrous at a later time.

The story itself is confusing and frustrating, somebody's twisted idea of a good time. If you like to assemble things with 150 parts with Chinese instructions (I'm assuming you don't speak it), or do large solid-color jigsaw puzzles, this may be just for you. I find it hard. I wouldn't recommend it if you don't have the time or patience for brain teasers; if you revel in adventure games, and haven't played Mindshadow, you should add it to your collection. I often start out thinking smugly "Ha, this isn't so bad." Before long I'm looking for potential projectiles. This one passed the projectile test. I'm waiting for my Hintbook from Activision (I won't admit where I'm stuck).

I would highly recommend saving your game prior to *each* time you make a significant decision, unless you want to start over from Square One often. Constant inspection and "thinking" in this game can't be overemphasized.

Criticisms? I won't say it's too easy. We at *AmigaWorld* are in mixed opinion about the quality of the illustrations. I feel they certainly enhance the play. The packaging claims you can "talk to the computer in plain English." Although this is true, you may be annoyed by some of the things it can't understand, and by some of the stock answers you get. (In fairness, this seems to be true of the adventure game genre.) I would rather be told, "You stike the door, but it gets you nowhere," instead of, "You cannot strike the door." If a game is to be highly believable, I don't want my options to be too limited. I want to be able to do just about anything, even if it is futile. I rarely strike doors, but I am capable, and who knows?

I would like to commend Activision on its packaging—no excuse exists for an Amiga program with dull or ugly packaging. Anyone who releases a program for the Amiga should make it slick, box or jacket and all. All in all, Mindshadow is a challenging, high-quality product.■

—AmigaWorld

Mindshadow
Activision Inc.
PO Box 7287
Mountain View, CA 94039
415/960-0410
$44.95

Monkey Business

An archaic arcade game.

Monkey Business is a Donkey Kong clone from The Other Valley Software. In the game, you take the part of an IRS agent trying to collect from Mr. Big. Mr. Big is protected by rolling trash cans, attack dogs and a huge bodyguard. By dodging all these obstacles, you get to Mr. Big and advance to the next level.

Monkey Business can be played from the keyboard or with a joystick. The game is unremarkable in both design and execution. Donkey Kong has been around for a long time, and this is not one of the better versions. The sound and graphics are reminiscent of circa 1978 Apple II software. The screen flicker is intolerable. I wonder why anyone would release a game in hi-res when most people don't own monitors that can handle the Amiga's interlaced mode? If you run across this game on your dealer's shelves, do yourself a favor and keep your hands in your pockets. Enough said.■

—AmigaWorld

Monkey Business
The Other Valley Software
976 W. Foothill Blvd.
Suite 490
Claremont, CA 91711
$24.95

Hors d'oeuvres

Unique applications, tips and stuff

You may be using your Amiga at work, you may be using it at home, or you may be using it in the back seat of your car, but in some way or other, you are going to be using your Amiga in a slightly different way than anyone else. You are going to be running across little things that will help you to do something faster or easier or more elegantly.

AmigaWorld would like to share those shortcuts, ideas, unique applications, programming tips, things to avoid, things to try, etc., with everyone, and we'll reward you for your efforts with a colorful, appetizing, official *AmigaWorld* T-shirt. (Just remember to tell us your size.)

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So, put on your thinking berets and rush those suggestions to:

Hors d'oeuvres
***AmigaWorld* editorial**
80 Pine St.
Peterborough, NH 03458

What's New?

Compiled by Bob Ryan

The Boards, They are A Changin'

Last issue, I told you about the 68020 piggy-back board from Computer Systems Associates. Since that time, CSA has released a version of the board specifically for the Amiga, called the **Turbo Amiga**. In addition to a 68020 and a 68881 math coprocessor, you can get the Turbo Amiga board with 512K of memory. The 68020 can access this memory 32 bits at a time. The Turbo Amiga should provide a greater performance boost to your Amiga than did the original CSA 68020 board. For more information, contact Computer Systems Associates, 7564 Trade St., San Diego, CA 92121. 619/581-0316.

When I Paint My Masterpiece

Aegis Development has announced the release of **Aegis Images** and **Aegis Animator**. Aegis Images is described by the company as a "professional paint program." It contains special spread and wash options, dithering (blending) and cycling of up to four color groups at one time. Pictures created with Aegis Images can be used as backdrops for animated sequences created with Aegis Animator. This program lets you create and display animated sequences featuring path plotting, storyboarding of up to nine separate animations, and clone and destroy of animated objects. You can rotate and size the animated objects to achieve a 3-D effect. Animator is based upon a process called tweening. If you position an object in two places on the screen, Animator fills in all the intermediate positions of the object.

Aegis is targeting these programs at the business market. It believes that the products will find a welcome home in the graphic arts industry. Aegis sees the products as being used for animated illustrations, advertising and teaching. Both programs require 512K. Aegis Images lists for $79.95. Aegis Animator is not available as a stand-alone product. It comes combined with Images for a total price of $139.95. Contact Aegis Development, Inc., 2210 Wilshire Blvd. #277, Santa Monica, CA 90403. 213/306-0735.

Aegis Development has also released their long awaited CAD package, **Aegis Draw**. With this package, graphic designers, architects, engineers and other professionals will be able to use the Amiga as a professional design tool. Aegis Draw lets you create lines, circles, arcs and multipoint curves. You can vary line thickness and fill shapes with color or patterns. You can also create a parts library so that you don't have to constantly redraw frequently used objects. Aegis Draw scales your drawings automatically. It allows you to zoom in repeatedly on a portion of your drawing and to work on that portion in the current window or in a separate window. The program also supports layering (which should be a real boon to the chip designers at Commodore-Amiga.)

Aegis Draw supports a number of third-party digitizers and plotters, in addition to the printers supported by the Amiga. Although it works with 256K machines, 512K is recommended. It will also recognize and utilize memory expansion beyond 512K. Aegis Draw sells for $200. Contact Aegis Development for details.

Mama, You've Been on My Mind(scape)

The people who gave you the Amiga Tutor have announced a bunch of new products for the Amiga. Mindscape, the Northbrook, IL software company, has ported a number of their more popular titles to the Amiga. The weirdest of these products is **Racter**, the program that brought you that literary classic, *The Policeman's Beard is Half Constructed* (Warner—$9.95). Described as an "artificial insanity" program, Racter is a gabby, slightly demented space-age philosopher with a large vocabulary and a command of English grammar that would do Norm Crosby proud. Racter is a conversational program: You ask it questions and it answers...sort of. One nice aspect of the Amiga version is that it makes use of the Amiga's speech synthesis capability and talks to you.

In addition to Racter, Mindscape has also released **The Halley Project**, **Keyboard Cadet** and **Brataccus**. The Halley Project is an educational game that gives you a grand tour of the Solar System. To advance in the game, you need to know such information as "which planet has two moons" and "which moon has an atmosphere." The Halley Project encourages you to learn some astronomy. Unlike other software packages that refer to Comet Halley, The Halley Project will not lose its usefulness or appeal after the comet has returned to the outer solar system.

Keyboard Cadet is a typing tutor. It's a fun way to learn how to use the Amiga keyboard. By hitting the correct key, you score points and keep from getting zonked by the letters. Keyboard Cadet shows the user the proper hand positioning for touch typing.

The last offering from Mindscape is Brataccas, a graphics adventure game that features continuous animation. You take the part of a scientist trying to keep your explosive knowledge out of the hands of both the government and the underworld. You escape to Brataccas, an offbeat asteroid, and there try to uncover the corruption of the government. If you're succcessful, you win the game.

Brataccas is a graphics-based interactive video game. Characters talk to you via dialogue "bubbles." You communicate with them by choosing conversational themes with the mouse. Brataccas could be the first in a new genre of adventure games.

Racter for the Amiga sells for $44.95. Keyboard Cadet lists for $39.95, while Brataccas and The Halley Project retail for $49.95 each. For more information, contact Mindscape, 3444 Dundee Road, Northbrook, IL 60062. 312/480-7667.

BASIC from the North Country

True BASIC Inc., of Hanover, NH, has announced the release of their **True BASIC Language System** for the Amiga. True BASIC conforms to the proposed ANSI standard for Basic. It features a full-screen editor and separate command and output windows. True BASIC is a portable language. The implementation for the Amiga is nearly identical to the IBM PC and Macintosh versions. True BASIC sells for $149.90. Generous bulk and educational discounts are available.

True BASIC Inc. is also readying a number of educational software packages for the Amiga. Written for senior high schoolers and undergraduates, these packages concentrate on mathematical subjects. Projected titles include Calculus, Pre-Calculus, Algebra II, Probability, Trigonometry, Geometry, Discrete Mathematics, TrueSTAT, CHIPendale (analysis of contingency tables) and Applied Forecasting. We will detail the features of the packages when they are released. For more information, contact True BASIC, Inc., 39 South Main St., Hanover, NH 03755. 603/643-3882.

Tangled Up In ED

Early one morning, the sun was shining, I was typing in ED. Wondering if it was saving it all, if my files could still be read.... *(whoops, sorry!)*

If you're a programmer who is less than satisfied with the text editors supplied with AmigaDOS, then you may want to check out **TD**, a full-screen text editor from Microsmiths, Inc. Designed specifically for programmers, TD is available from both CLI and Intuition. It can handle both text and binary input. TD retails for $39. For more information, contact Microsmiths, Inc., PO Box 561, Cambridge, MA 02140. 617/356-7908.

Subterranean Software Blues

Custom Services of Collingswood, NJ wants to sell you software, and it has a unique way of going about it. If you send the people there a disk, a stamped, self-addressed return mailer and $1, they'll put a catalog of their products on the disk and one application program. The program is **FIND**, a utility that searches a text file for a sequence of characters that you specify. You can also specify a Soundex search, if you're not certain of the spelling of the object string. Wild-card characters can also be used to increase the flexibility of the search. If you're interested in what Custom Services has to offer, send your disk, dollar and return mailer to Custom Services, 218 B Sutton Towers, Collingswood, NJ 08107.

Time Passes Slowly

A-Time, a clock/calendar module for your Amiga, is available from Akron Systems Development (PO Box 6408, Beaumont, TX 77705. 409/833-2686). A-Time attaches to the parallel port of your Amiga. You don't lose the use of the port; A-Time has a connector for your printer.

Unlike the clock in your Amiga, A-Time comes complete with battery back-up. You'll never have to "Use Preferences tool to set date" again. The price is $50.

Never Say Goodbye

Micro-Systems Software has released the first bulletin-board software for the Amiga, **BBS-PC**. This package allows you to use your Amiga as an electronic bulletin board. It features E-mail, uploads and downloads and multiple sub-boards. BBS-PC works on a 512K Amiga with one disk drive, although multiple drives or a hard disk are recommended. According to Micro-Systems Software, the program works with virtually any command-drive, auto-answer modem, although the system defaults are written for the Hayes Smartmodem 1200. BBS-PC retails for $99. For more information on how to turn your Amiga into an automatic messaging center, contact Micro-Systems Software, 4301-18 Oak Circle, Boca Raton, FL 33431. 305/391-5077.

Tomorrow is a Long Time

Data Share, Inc., has announced that it is developing a number of harware add-ons for the Amiga. The **Buss Station** provides eight expansion ports, five power outlets and a RAM expansion port that can hold up to eight megabytes of memory. An optional multi-port data switch, the **Associate**, gives your Amiga two additional parallel and serial ports, giving you six output ports. You can still only use two ports at one time, but the Associate can save a lot of cable swapping.

In addition, DSI is going to produce **Visions**, an adapter that lets your Amiga drive a TTL RGB monitor, and **Voices**, a stereo speaker and amplifier unit for the Amiga. DSI will also be selling interface cables for the Amiga. At press time, price and availability of the DSI products for the Amiga had not been set. Contact DSI, 717 South Emporia, Wichita, KS 67211. 316/264-6118.

News Briefs

A number of companies are selling **256K memory upgrades** for the Amiga. These include Microbotics (PO Box 855115, Richardson, TX 75085. 214/437-5330) and Michigan Software Distributors Inc. (43345 Grand River, Novi, MI 48050. 313/348-4477). ►

The Microbotics upgrade costs $149.95. The one from Michigan Software Distributors costs $159, but it may still be available at the special introductory price of $129.

Activision's **Music Studio** is a powerful music composition tool designed for the Amiga. At press time, the exact release date and price had not been established, although a March release was expected. Contact Activision, 2350 Bayshore Frontage Road, Mountain View, CA 94043. 415/960-0410.

User's groups are starting to spring up around the Amiga. If you live in New Jersey, you might want to check out the Jersey Amiga User's Group. It meets on the next-to-last Friday of each month on the campus of Rutgers University in New Brunswick, New Jersey. For further information, contact Perry Kivolowitz at 210/271-4522.

The Amiga User's Group of the Boston Computer Society meets on the third Tuesday of every month at the Department of Transportation, Kendall Square, Cambridge, MA. Contact the BCS at 617/367-8080. If you live in North Carolina, contact Paul O'Keefe (808 Colleton Road, Raleigh, NC 27610) for information about the "Amiga Club" (they don't have an official name yet). The club meets in Raleigh, NC.

The North American Amiga User's Group charges a $25 membership fee. It publishes the *AmigaHelp* newsletter and offers a Helpline for members. Write to NAAUG, PO Box 376, Lemont, PA 16851. If you're looking for an Amiga BBS, try the AmigaBoard at 213/478-9788. (300/1200/2400 baud, 8 data, 1 stop, no parity). The board is located in Malibu, CA. It is a technical board for new Amiga owners.

If you coordinate an Amiga users group or run a BBS for Amiga owners, drop me a line at User's Group/BBS Directory, *AmigaWorld* editorial, 80 Pine St., Peterborough, NH 03458. I'll publish as many listings as space allows.

A Note to Developers

If you have developed a new product for the Amiga, let us know about it. Send a release describing the product along with the price and expected release date to New Products, *AmigaWorld* editorial, 80 Pine St., Peterborough, NH 03458. Here at *AmigaWorld*, we try to mention as many new products as possible, but we can't mention *yours* if we never hear about it!■

(My apologies to Bob Dylan: I wrote this installment of What's New? while under the influence of Biograph.)

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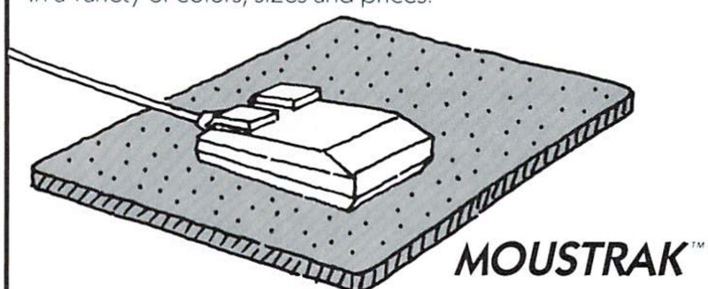
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Miami Lakes, Fl. 33014
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Amiga in the Schools: A Realistic Look

By Larry Lashway

The most dramatic revolutions are the ones that never come. Just leaf through the ads in any popular magazine from World War II, and you'll see a vision of the future that teased a war-weary public: commuting to work in personal helicopters, robots to do the dusting, moving walkways and monorails. . .attractive images that never quite made it to reality.

The same sort of utopian visions have accompanied the microcomputing boom, especially in the field of education. The breathless predictions here have included computer-guided curricula, completely individualized programs, even the end of school as we know it, with students staying at home in front of their monitors. Well, be advised: *it ain't happening yet.*

True, there's a lot of activity as schools rush to achieve computer literacy. Teachers are going to workshops, educational software has proliferated beyond counting and computers are being purchased by the truckload. A presidential commission has even defined computer literacy as one of the new basics.

But most of the action is akin to what happens when you kick an anthill: there's a lot of scurrying around to fix the damage, but eventually things settle down, and the place looks pretty much the same as it did before. Education has a long history of technological promises that never get past the rosy prediction stage, and a pessimist can find signs that this fad will be no different. If you read the current literature about computer education, it becomes clear that most schools have at least exhausted their first wind and may even be undergoing a period of disillusionment.

To be sure, the computer revolution is less than a decade old; considering that Gutenburg had been in his grave a century or more before textbooks became widely used, perhaps we shouldn't expect too much too soon. Our high expectations also make it easy to overlook the fact that computers *are* getting into the schools. In 1979, there were virtually no microcomputers in American schools; today, there are well over a million, with forecasts of five million by 1990. That may or may not constitute the "critical mass" that some people see as crucial to a real revolution, but it does represent a respectable achievement.

But this very success has revealed that no one is quite sure how the new technology should be used. Should schools be concentrating on teaching students how to program? Using computers as surrogate teachers? Developing word processing skills? Just teaching *about* computers? And while some teachers have enthusiastically embraced the new technology, many others remain uncertain or skeptical. Worst of all, despite the heady rhetoric about creative/interactive programs, most of the software has turned out to be distressingly ordinary.

The Amiga: Promises and Problems

And now, at this less than auspicious moment, comes the Amiga—an exciting machine that renews hopes of a real revolution in computing. Technically, the Amiga promises all kinds of goodies for educational programs: built-in speech synthesis, stunning graphics, blazing speed and programming ease, to name a few. No question, anyone who wants to write educational programs will find the Amiga a versatile tool.

But technical wizardry won't be nearly enough to make it a force in education. As good a piece of hardware as it is, the Amiga is burdened with one fat negative: cost. For the price of one Amiga system, a school can buy itself a handful of C-128s, or a couple of Apples or a bushel of software. Before forking over their $2,000, educators will have to be convinced that the Amiga is giving them something they can't get anywhere else; slick graphics on the same old programs just won't turn the trick. For all its versatility, the Amiga won't be bought as a computer-for-the-sake-of-having-a-computer.

The Amiga's immediate future is further clouded by likely changes in software marketing. So far, educational programming has been mostly a cottage industry, with numerous small companies writing programs that

they think might be useful in a classroom. This won't last: in the chaos of the educational marketplace, there are just too many programs competing for too few places in the curriculum.

Catch-22

Significantly, major publishers are beginning to develop their own software, most of which will be closely coordinated with existing textbooks. Such software isn't likely to be particularly inspirational, but it will appeal to teachers because of the way it meshes with their daily lesson plans. We can also be sure that these programs will be written for the technology that's already out there: Apples, C-64s and Tandy Color Computers. Publishers won't start writing Amiga versions until there's a solid Amiga base in the schools, and schools won't buy Amigas until there's a solid software reason to do so.

Catch-22? Perhaps. Amiga's "market niche" problem clearly isn't limited to business. But the bright spot in this picture is that for all the hardware and software in circulation, schools are still waiting for programs that'll do the things that need to be done. Despite a virtual explosion of educational software, teachers who look to the computer as an instructional tool have been largely disappointed. It has, in fact, become almost axiomatic to say that the majority of programs are "junk."

This may only reflect frustration over the difficulties of making choices in a glutted market, but there's no doubt that many programs have been hastily put on the market with little testing, sometimes with results that can only be called absurd. (A friend of mine who reviews science software reports seeing a program that simply filled the screen with block after block of text.)

It might be easy just to write this off as another example of Sturgeon's Law ("90% of *everything* is crud"), except that even the exemplary programs, the ones that take full advantage of the computer's unique characteristics, haven't made significant inroads either. In most cases, it's because these programs don't match what teachers are trying to do at an everyday level. ►

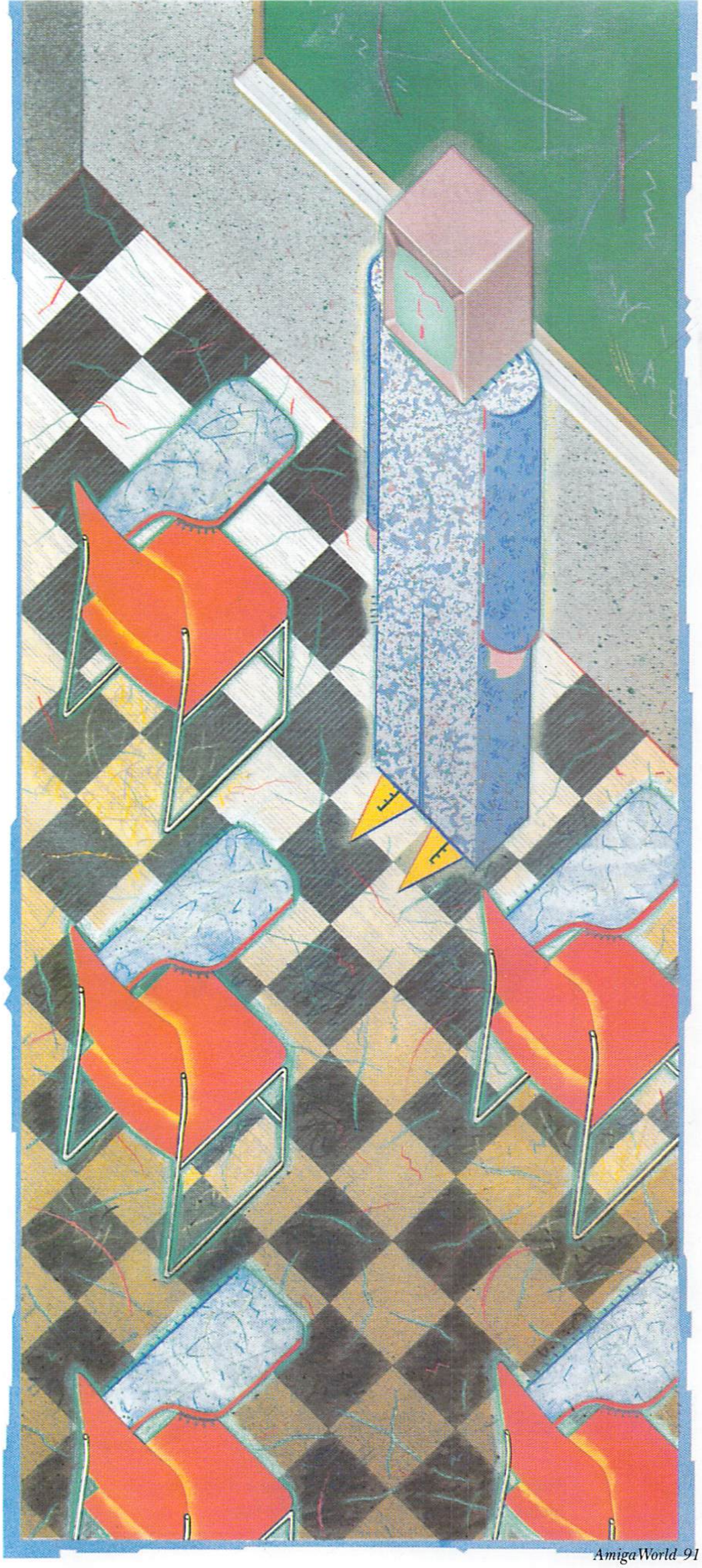


Illustration by Stephen Lyons

Few schools have bothered to determine whether computers actually make a difference in student achievement.

Take Rocky's Boots, for example. This award-winning program takes children through the mysteries of Boolean algebra in a down-to-earth way that combines direct teaching and creative exploration. Most users—adults included—are enthralled with the program. But most teachers aren't quite sure what to do with it. (My own students, who are preparing to become teachers, scratch their heads and say they would use the program as a "supplement"—meaning, I suppose, that it would be an activity for children who had already done their real work.)

Boolean algebra, after all, isn't a big curricular priority in most schools. In general, the problem-solving and creative-thinking skills involved in the best educational software aren't at the heart of the curriculum. As a result, the programs are used by some children (usually the better students), but only as a supplement to the more traditional classroom activities.

Pulling Together

So how do we get the right kind of software? My own hunch is that it's going to take a new kind of collaboration between teachers and programmers, one that's been all too rare so far. Up to now, the emphasis has been on nuts-and-bolts implementation, without bothering to ask "Does anybody really need this?"

Granted, if you ask most teachers what kind of software they need, you'll probably get a shrug: since they haven't used computers, they don't see many applications. What teachers *do* know, however, is where to find the rough spots in the curriculum, the places where students consistently struggle and stumble. We need to ask: "What are the concepts your students find most difficult? What are the things that just don't seem to click, no matter how much time you spend on them?" Questions like that will get you an earful; *then* you can go out and write a program.

It won't really be that simple, of course. The collaboration will have to be a continuing one; programs will need to be field-tested to see how students actually use (or misuse) them. Preferably, there will be hard-core evidence to show that students using these programs learn better than students using traditional methods. (Amazingly, few schools have bothered to determine whether the addition of computers actually makes any difference in student achievement.) Above all, a learning problem that stumps experienced classroom teachers isn't going to solve itself just because a computer is involved; you can count on lots of trial and error, with heavy emphasis on error.

"Quiet" Revolution

If all this seems unimaginative or even reactionary (do we really want to use the Amiga's unlimited potential just to reinforce the same old curriculum?), rest easy. Sometimes the best way to get to the future is to deal with the here and now.

In the excitement of living at the threshold of the computer age, we may forget that there are, after all, two types of revolutions. One—let's call it the "junta" model—involves a lot of commotion, trumpeting and grandiose dreaming, most of which goes on over people's heads. Consequently, nothing changes but governments. The other type is the "quiet" revolution—it arrives without a lot of publicity, but it changes the landscape forever. When the first automobile chugged down a dusty village road, people were amused, frightened, intrigued or outraged, but no one saw what the car was going to do to American life. More importantly, people didn't buy cars because they saw a revolution coming; they bought them to solve some basic everyday problems.

In other words, if the Amiga—or any other computer—can make a dramatic difference in what kids are learning *now*, the revolution will take care of itself.

For one thing, the demand will grow. Expensive or not, a tool that helps people accomplish their jobs is going to be in demand. Just seven years ago, most businesses got along quite nicely without electronic spreadsheets; try taking away an office's Lotus 1-2-3 today, and the place would shut down. A really useful, versatile

tool will create its own demand. (Keep in mind that a lot of Apple's early success was due to VisiCalc; people wanted the program so badly that they bought the only computer it ran on.)

More importantly, any program that successfully solves a knotty instructional problem is likely to involve a new approach, especially with the Amiga, which can be so much more than an electronic blackboard. Somewhere in the mix of graphics, sound and multitasking, programmers may well hit on a solution that changes the way we think about teaching, just as VisiCalc changed the way accountants go about their work.

Visual Imagery and Abstract Concepts

What will these solutions look like? If I knew the answer to that, I'd be writing a different article. But I do have a strong hunch that the Amiga's graphics will play a major role, and not just as colorful illustration or superficial entertainment. It may be, in fact, that the computer's major contribution to education will be not so much in the development of logical/deductive thinking as in the linkage of visual imagery with symbolic thought. (Most of us in education are so entranced with the power of abstractions that we forget that every abstract concept is ultimately built upon a foundation of vivid concrete examples.)

For instance, there's growing evidence that a lot of students, even after a course in physics, don't really understand basic physical laws. They can easily memorize Newton's second law, yet utterly fail to apply it correctly to, say, motion on a frictionless surface. The reason is that the real world gives them limited experience with frictionless surfaces. With computers, we can build a "microworld" that provides that experience in a vivid way. (A ready example is a program in Commodore Logo called Dynatrack, which involves keeping a turtle moving around a circular, frictionless track—a frustrating experience, but one that enhances our understanding of the world.)

Another fertile area is history, which most students find impossibly remote from everyday life. Given the Amiga's capabilities, I've been wondering what software developers like Infocom or Electronic Arts could do with a historical adventure game, where the student's imagination could be linked to images and sounds that evoke the feeling of an entire era.

The Critical Mass

Those are just guesses, but there's no guessing about the Amiga's potential. With any luck at all, we may be in for a repeat of the Apple II experience, in which a technically superior product triggered a deluge of applications that its inventors couldn't possibly have predicted. Whether schools will be able to tap the Amiga's potential depends on our ability to link the technology to the needs, wishes and dreams of the teachers and students who will be using it. That, I think, is the true critical mass, and if it gets here, we may indeed see a revolution that can only be dimly imagined now.■

Address all author correspondence to Larry Lashway, PO Box 151, Sheboygan Falls, WI 53085.

Help Key

By Bob Ryan

If you have questions about the Amiga or Amiga-related products, send them to Help Key, AmigaWorld *editorial, 80 Pine St., Peterborough, NH 03458. Sorry, I can't answer all your questions, but I will answer those of general interest.*

Resolution Blues

Q: The geniuses at Amiga may have committed a major faux pas when they designed a graphics machine whose chief resolution mode is 640 × 200. I understand that it may be possible to correct this blunder with some changes in system software. I assume they or some other enterprising people will come up with a solution very soon. In the meantime, how can I gain access to the interlaced 640 × 400 mode?

Robert White
Chicago, IL

A: Access to the 640 × 400 interlaced mode is controlled by software. If you're using a commercial program, consult the program's manual to see if the program supports the hi-res mode. For example, Deluxe Paint from Electronic Arts will run under hi-res if you load it by typing "dpaint hi" instead of the normal "dpaint".

From Amiga Basic, you use the Screen command to produce a hi-res display. Simply specify 640 as the width of the screen, 400 as the height and 4 as the mode of the screen you open. See pages 8–133 of the Amiga Basic manual for details about the syntax of the Screen command.

I don't agree that Commodore-Amiga "blundered" in producing a graphics-oriented computer that has a maximum, non-interlaced resolution of 640 × 200. In fact, I find that low-res mode (320 × 200 with 32 colors) is more than adequate for my needs. But then, I used to own an Apple II Plus, so I'm used to getting by with less—except, of course, with less software.

Flicker, Flicker Little Star...

Q: I have a number of questions about the Amiga. What causes the Amiga's RGB monitor to flicker when in 640 × 400 mode? Does it harm the monitor to keep it in hi-res mode for extended periods of time? Would the Amiga be capable of driving a 1,024 × 1,024 pixel monitor if one became available? Finally, what type of hardware upgrades are possible with the Amiga?

Dennis Rose
McLean, VA

A: The flicker you encounter in hi-res (640 × 400) results from the fact that, in this mode, your Amiga is not quicker than the eye. Normally, the Amiga (or any computer) refreshes its screen display 60 times per second. The screen elements are designed to stay "on" for at least one-sixtieth of a second after they are excited by the stream of electrons that produce the display. In interlaced mode, however, each screen element gets refreshed only thirty times per second. (The computer uses two one-sixtieth of a second passes to produce the display.) The screen elements do not remain excited until the next pass of the electron gun and, consequently, the screen flickers.

If you need a non-flickering, hi-res display, you might want to try a high-persistence monitor with your Amiga. Although Commodore doesn't sell such a monitor, your dealer should be able to provide you with information about monitors with high phosphor persistence. If you can't afford a new monitor, you should try lowering the brightness and contrast of your display. This will eliminate most of the flicker, at the expense of picture clarity.

It doesn't harm your monitor to leave your Amiga in hi-res mode for extended periods. Also, the Amiga should be able to drive a 1,024 × 1,024 monitor should one become available. Such a monitor will not, however, have any effect on the resolution of the display produced by the Amiga. You'll still be limited to the resolution provided by the Amiga.

Regarding your last question, I'm not quite sure what you mean by hardware upgrades for the Amiga. There are a number of hardware peripherals available for the Amiga, like the T-Card from Tecmar and the Buss Station from DSI. Check with your dealer and watch the What's New? column for details.

The Next Big Thing

Q: I'm very impressed with the Amiga computer and I noticed that AmigaWorld *has often mentioned the 68020 chip. I would like to know if there is any development taking place on a 68020-based Amiga. A true 32-bit Amiga would be a real boon.*

Charles Carpenter
Tennessee Colony, TX

A: I'm afraid that Commodore is not in the habit of informing me or just about anyone outside the corporation about their long-range product plans. Commodore has made it plain, however, that the Amiga 1000 is the first of a family of compatible computers. Jay Miner, the primary hardware designer of the machine, has been quoted as saying that he is constantly working to improve the Amiga custom-chip set. From these and other indications, it's a pretty safe bet that Commodore is looking into a 68020-based Amiga.

The question then arises about when such a machine would be released. Frankly, given Commodore's financial situation and the fact that the Amiga 1000 is such a new machine, I don't expect to see a 32-bit Amiga from Commodore before 1987.

Hello, Big Blue

Q: I have a couple of questions about software emulators. What degree of IBM PC compatibility will be provided by the Amiga Emulator from Commodore? Also, are there plans to have the Amiga emulate other computers through software emulation?

Chris Willey
Phoenix, AZ

A: Since, at the time I'm writing this (late January), the Emulator has yet to be released, I don't know how well it will be able to emulate an IBM PC. I've seen a number of pre-release versions, and each has been faster and better than the previous ones, but none of them has been able to do graphics or to run anything other than "plain vanilla" MS-DOS software. At this time, it is unclear whether the initial release of the Emulator will be able to use graphics software or if that feature will be made available via upgrades.

Commodore's goal is to get the top IBM PC packages running on the Amiga. Commodore sees the Emulator as providing IBM owners with a bridge to the Amiga. The Emulator will not turn your Amiga into an IBM clone, but it may provide a nice incentive for IBM owners to embrace Amiga technology. The Accelerator will also help in this regard, since some software runs painfully slow under the Emulator.

As far as I know, no one is looking to have the Amiga emulate any other computer systems. There is a company, however, that is producing an IBM PC emulator to compete with the one from Commodore-Amiga. The company is Soft Team. We'll be taking a close look at this product when we get our hands on one. We'll also keep you informed about what PC packages will work with an Amiga-equipped Emulator.■

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Coming Attractions

Up till now we have been almost silent about the sounds, songs, speech and other vocalizations of the Amiga computer. Our next issue will have articles hovering around the Amiga's music capabilities, the sound effects you can create, the noises, the products and the software. The people who play, the people who perform. The people who invented the chips. The people who are going to use the Amiga's capabilities. The reality and the future. As always, our next issue will be even better than the previous one. Filled with reviews, news, columns, spiffy articles, advertisements, and as an added bonus, a table of contents, complete with titles, authors' names and page numbers! You won't want to miss it.

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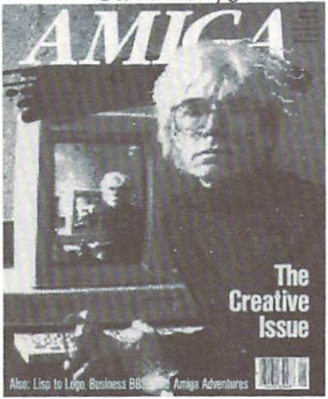
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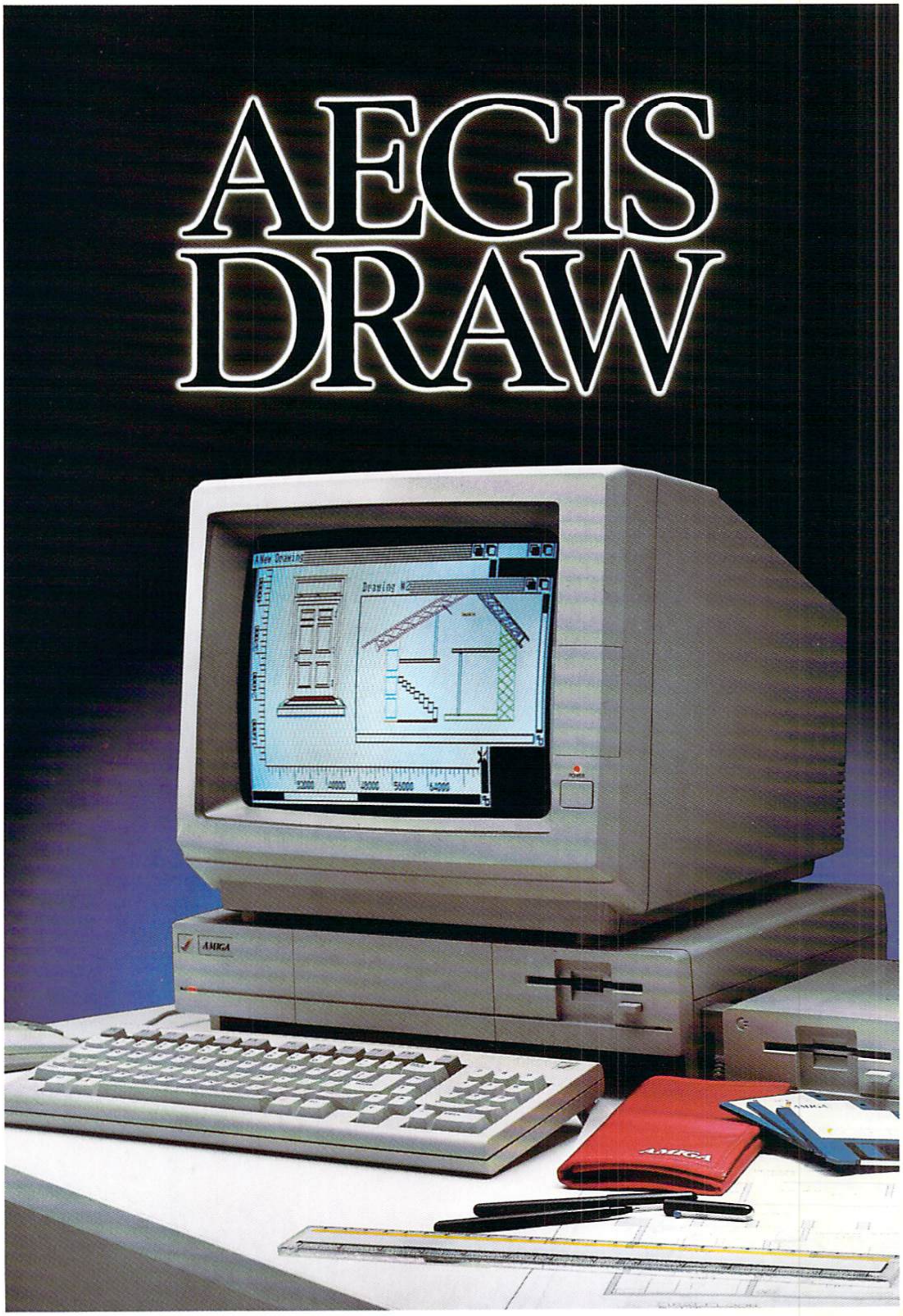
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